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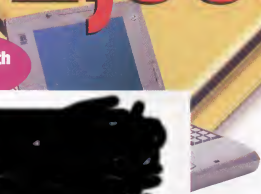

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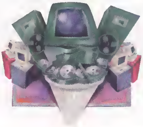

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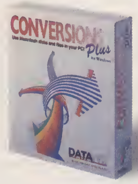

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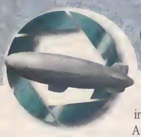


Imagine the Goodyear blimp shrunk to the size of a 5-foot floating pillow—television camera and all. Now imagine what you could do with such a device. Perhaps you could use it to tour faraway museums and attractions or inspect a house for sale in another city.

A similar **floating "blimp cam"** is being tested in a computer science lab at the University of California at Berkeley. A bright blue latex balloon hovers over desks and drifts down hallways, carrying a little camera, microphone, and transmitter to broadcast live video images and sound to a computer via the Internet. The balloon, which is powered by three small propellers and several AA batteries, has explored stairwells and elevators and was even used to talk to by-passers along the way.

This "space browser" belongs to a new generation of low-cost robots intended to give computer users the sensation of being somewhere without physically being there. Developers still are testing a variety of blimps, from the 5-foot latex pillow to smaller Mylar cylinders, and hope their invention someday will be a common means for users to contact others or explore using the Internet. ●

Electronic Or Print?

The name that frightens some of the biggest names in the computer industry has cast its shadow over yet another market. Microsoft, the giant that has joined and quickly climbed to the top of many markets from operating systems to online services, now has its eye on a new outlet—the news. The company reportedly plans to start local news services in several cities via the World Wide Web that would offer users entertainment information such as movie listings and restaurant offerings.

Microsoft isn't the first company to take local news online. Services such as America Online offer localized news to a few cities, some Internet services offer electronic classified advertisement systems, and numerous newspapers already have Internet news sites.

Some **publications are a little nervous about Microsoft's entry**, probably with good reason. Electronic documents are more searchable than printed ones and can be more timely, eliminating the printing and delivery process of newspaper stories. In addition, these electronic news sources may steal needed display and classified ad income.

But the chances that "electronic news" will end newspapers forever are slim. Tony Ridder, chairman and chief executive officer of the Knight-Ridder newspaper chain, says computers may become the medium of choice for certain kinds of information, such as stock reports, classified ads, and specialized news that will appeal only to a small portion of the news audience. But they won't completely replace ink on paper. They may merely change the scope of newspapers, a little like broadcast news did, making newspapers more complementary and complete than the information found online. ●

No Strings, Or Wires, Attached

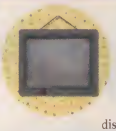
Sending E-mail, faxes, and computer files through free, **wireless links rather than paid telephone lines** would be possible under a plan federal regulators unveiled recently. The Federal Communications Commission passed a preliminary plan to make part of the public airwaves available for wireless technologies on an unlicensed basis. This means people buying devices using this spectrum, unlike cellular phone customers, would not have to subscribe to a service or pay for the usage.

This isn't necessarily good news for average home consumers. The frequencies are located in the five gigahertz (GHz) band; signals in those frequencies can only travel short distances—between 300 and 750 feet or up to 8.7 miles with rooftop antennas and no obstructions. The technology wouldn't be very successful in cities because the signals can't penetrate brick or glass well. It's also bad news for telephone companies who bought federal licenses to sell similar two-way wireless data services.

The FCC's move, however, is great news for schools, hospitals, and businesses. It would let these organizations create wireless local-area networks connecting classrooms or different buildings within a business, without having to tear down or drill through walls. It's also good news for companies such as Apple Computer that plan to sell radio-equipped computers operating on the wireless frequencies.

But the plan isn't law just yet. The FCC still must give final approval, which it expects to do later this year after reviewing comments from the public. ●

TV On The Wall

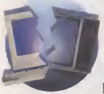


In the future, you may not worry whether your new television will fit in your entertainment center. Instead, you'll probably be concerned about **where to hang the TV**. Fujitsu Microelectronics Inc. recently demonstrated a 42-inch diagonal color **flat plasma display** panel TV at the National Association of Broadcasters' Convention. (Some portable computers use a flat plasma display to create images by charging a gas between crisscrossed electrodes.) As if the sight of such a television wasn't amazing enough, the TV on the wall made its debut receiving an over-the-air broadcast of **high-definition television (HDTV)** through a transmitter developed by Westinghouse.

The Fujitsu display was big enough to do justice to the new high-resolution, digital broadcast signal, yet slim and light enough to hang on the wall. Actually measuring 36.22 inches wide x 20.39 inches high x 2.95 inches deep, the television displayed video in 16:9 wide-television format (similar to the shape of a movie screen).

About how much would it cost to own a high-tech, hanging TV? Fujitsu is sampling the original equipment manufacturers market, trying to sell the panels there for $12,000 each. The systems then will be available in volume for approximately $5,000 in October. The prices are expected to drop even more dramatically when the TVs eventually are offered to the consumer market. ●

TVs/PCs Hit The Great Divide?



As TVs and PCs converge, the companies making it happen are miles apart, literally and figuratively. While the nation's biggest TV maker, Thomson Consumer Electronics, came to New York earlier this year to show off a prototype of its new RCA Genius Theater, complete with Internet access and computing functions, Microsoft was in California introducing its own ideas for **makings PCs the center of home entertainment**.

The RCA Genius Theater will handle cable and broadcast television, digital satellite signals, videotapes, compact discs, and World Wide Web pages in one system using an on-screen interface "guide" that brings together related information. For instance, while watching "The Lion King" video disc, you might see an icon on the guide with a link to the Lion King music CD or Disney's Web site. There are no file structure or folders to worry about.

Microsoft retained the files and folders but is working on basic functions for its PC under the name Simply Interactive Personal Computer, or SIPC. SIPC is made up of a number of improvements, such as a cable that lets data move faster between a PC and other devices (including VCRs, stereos, and TVs) and an instant-access startup system for PCs called OnNow. Numerous computer companies have already endorsed the general SIPC standard. ●

DVD Delivers

Step aside CD-ROM; make way for **DVD-ROM**. Philips Electronics recently demonstrated a working Digital Video Disc, read-only memory prototype drive to play the high-density **discs that could hold feature-length movies**, music, and computer data.

The storage medium has a long, jaded past. Originally, there were two standards: Sony and Philips' MultiMedia Compact Disc (MMCD) standard and the Super Density (SD) format by a group of companies headed by Toshiba. But two was too many. Finally, during late 1995, the companies proposed one high-density format that could hold about 4.7 gigabytes of data. It could be used for all sorts of things such as high-density storage for computers, videodisc players for home videos, or CD players for interactive TV video-game systems.

Philips is also working to include in its drives a "backward-compatible light path" that would let DVD players also play current CDs. Philips believes the DVD-ROM players for computers will sell faster than the DVD-Video players for television because the drives should sell to computer manufacturers who will incorporate them into PCs for about $200. The computer world also has a greater need for better video quality than the general consumer market. Philips says it plans pilot runs of the DVD-ROM drives in early autumn of this year, complying with the final DVD specifications, before they are available sometime in 1997. ●

PRODUCT PREVIEWS

MIGHTY MORPHIN PIPPIN RANGER: Japan is the first testing ground for a simple, **low-cost computer wanna-be**. Bandai Digital Entertainment has introduced a device, costing about $620 and designed by Apple Computer, that attaches to the TV so users can play video-game CDs or music CDs and connect to the World Wide Web.

The Pippin Atmark is quite a switch for the toy company that also makes the Mighty Morphin Power Rangers. But Bandai feels there will be a market for a device that's about the size of a video-game machine and uses a Macintosh-like operating system and the *Netscape Navigator* Web browser to explore the Internet.

Pippin also will test whether Apple can carve out a new market for itself. The company went through some tough times the end of last year, finishing in the red and losing its CEO. Apple will pay close attention to Pippin's effect on Japanese PC sales. PCs are actually less common in Japanese households than in the United States. The Pippin may appeal to people who don't want or need a full-fledged PC but desire Internet access. The market there is also uncertain, as NEC Corp., with its proprietary-designed PCs, is losing its monopoly to Apple and IBM-compatible computers. So far, Japanese customers have shown strong loyalty to the Macintosh because of its ease of use.

As for the rest of us, Bandai (310/404-1600) expects to introduce the Pippin in the United States this summer, and Apple is talking to other manufacturers about building the machine, as well.

TEN-SPEED CDs: CD-ROM speeds have finally hit double-digits. While **quad-speed**, or **4X**, CD-ROM drives are the basic requirement for most multimedia software today, consumers can buy CD-ROM drives that operate at 6X, 8X, and now 10X speeds.

Just how fast is a 10X? Average 1X CD-ROM drives can transfer data from a CD-ROM at a rate of 150 kilobytes per second (KBps). Today's standard 4X drives can transfer about 600KBps of data. And now 10X drives have a data transfer rate of 1.5 megabytes per second (MBps), or 1,500KBps.

Pinnacle Micro (800/553-7070) recently introduced internal 10Xtreme drives for the consumer and home markets for about $299. Pioneer New Media Technologies (800/444-6784) also has introduced Pioneer Super 10X drives but is selling them only to computer companies to incorporate into their systems. The Pioneer Super drives boast a **Constant Angular Velocity** technology that spins the CDs at a fixed rate, whether it's reading from the inner or outer tracks of the CD. (Current CD-ROM drives generally use **Constant Linear Velocity**, allowing the disc to rotate a little faster when reading inner tracks.) ●

Tech Shorts

Fortune 500 companies prominently promote their E-mail addresses, Web sites, and use of the Internet for research. But **that's not all they're doing with the 'Net.** According to Jumbo! (http://www.jumbo.com), a Web site containing free software, those well-connected corporations download thousands of games. Companies such as AT&T Bell Laboratories, Citicorp, Dun & Bradstreet, IBM, and JP Morgan were among the top corporate sites downloading free computer games. Together, the corporate sites downloading games from Jumbo! chalked up more than 800,000 games during the first quarter of 1996. A Jumbo! spokesperson speculated that the employees were simply "assuaging the pain of downsizing" over the lunch hour. . . .

Digital High Definition Television (HDTV) took another step forward recently when television broadcast and equipment manufacturers agreed to **establish a fully-operational HDTV station** in the United States. The Association for Maximum Service Television (MSTV) and the Consumer Electronics Manufacturers Association (CEMA) appointed a project director and agreed that Washington, D.C., would be the station's site. Washington-area stations were invited to apply for conversion to the entirely digital, high-resolution system. The project is expected to take about three years, beginning with the installation of an HDTV transmitter and encoder at the "host station" later this year. . . .

Java has become **too big for even Microsoft to ignore.** (Java is the programming language from Sun Microsystems that lets people add features such as animation to electronic documents distributed on the Web without requiring a special software add-on or specific operating system.) Microsoft recently announced its plans to modify Java to optimally run with Windows-based computers and incorporate a portion of Java into a new version of Windows 95. The company hopes that will give Windows an edge over other operating systems. However, some analysts have gone so far to say that the introduction of Java will eventually mean you may never have to worry about operating systems. Consultants from the KPMG Peat Marwick consulting firm say that someday the Internet itself will be a rival operating environment, unseating industry giant Microsoft, with Sun's Java leading the way. But will it ever go that far? Right now, it seems that only time will tell. . . .

It seems there are no permanent rivals in the PC marketplace. When Apple first came out with its personal computers in the '80s, IBM soon followed with its own. Computer companies following IBM's lead knew they couldn't compete with Big Blue's already-established worldwide markets, and began making IBM-compatible PCs. Meanwhile, Apple decided to compete with its own Macintosh computers and operating system. Although IBM and compatible computers with the DOS/Windows operating system dominate the personal computer market, Apple remains one of the top computer manufacturers.

But the market has taken a strange twist. IBM has decided to license the Apple operating system to use and resell. With the Macintosh software in hand, IBM will be better able to approach potential builders of PowerPC-based machines with more of the ingredients they need to build the computers. (Apple and IBM collaborated to develop with Motorola the PowerPC microprocessors as an alternative to Intel chips.)

Although it doesn't mean much unless IBM and other big manufacturers begin to make Macintosh systems—only about one out of 10 PCs sold around the world now are Macs—who would have guessed back in the '80s that Goliath might one day take David by the hand? ●

People And PCs

In Rosemary Carlson's graduate-level financial management class, students may **take in a lecture in pajamas** and turn in homework at 1 a.m. on a Sunday. In fact, the students have never been in a classroom together. Carlson, an associate professor at Morehead State University in Kentucky, teaches one of the school's first online classes. Students must enroll, be accepted, and pay tuition just like a regular class, but all the lectures, assignments, tests, and classroom discussions happen via E-mail.

Carlson says one of the strong points of the medium is that students don't all have to be at the same place at the same time, making it possible for working professionals with Internet access to enroll from anywhere. She says she actually knows these students better than those in a traditional class, as many students participate more readily via E-mail. And the students have found that in addition to learning financial management, they are learning computers and the Internet as well. . . .

The military is training a new breed of warriors, armed not with guns or tanks, but with computers to **patrol the Internet for online enemies.** "Cyberspace sentries" are becoming more important with the military's increasing dependence upon computers for everything from designing new weapons to ordering toothpaste for commissaries. In addition to stealing data, intruders can enter false information, overload a system, or insert viruses.

Navy Lt. Ken Loker has helped design a new course in defensive tactics for senior enlisted personnel from all branches of the military and civilian Defense Department technicians, beginning with a pilot program this summer at Corry Station Naval Technical Training Center in Pensacola, Fla. Students will learn to find holes exploited by unauthorized people on military computers, plug the holes, and do data recovery. If the class is successful, it will be taught at other bases, and graduates will work for administrators securing military systems. ●

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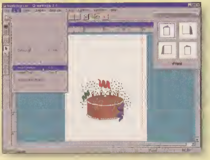

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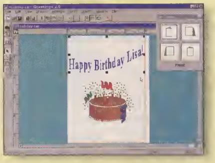

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Product Development Center, One Parsons Drive, Hiawatha, IA 52233

Your priority code is 771306D

SYSTEM REQUIREMENTS: Greetings 2.0 for Windows requires an IBM® or compatible PC, 4MB RAM, Microsoft® Windows 3.1, Windows NT 3.5 or later, or Windows 95, and 6MB hard drive space. Mouse required. **Greetings 2.0 for Macintosh** requires System 7.0 or better, 4MB RAM (8MB recommended), an 11-inch monitor or larger (Powerbook monitor ok) and 5MB hard drive space. All CD-ROM versions requires a CD-ROM drive. Shipping and handling are non-refundable. Copyright © 1996 Parsons Technology, Inc. All rights reserved. Greetings is a trademark of Parsons Technology, Inc.

Thank God Almighty, It's Free At Last!

There's no such thing as a free lunch, but now there is free E-mail. After nine months of testing, Juno Online Services announced in late April the release of a free Internet E-mail service. The service is available to almost anyone who lives in the United States, owns a modem and a computer, and has local telephone service.

In return for the free E-mail (there's always a catch), the user must accommodate the people who pay for the service—the advertisers. Everyone who takes advantage of Juno's offer completes a user profile, including demographic and personal information. The compiled data is then presented to potential advertisers, who have the option of downloading advertisements to every user of Juno or only to those who match the business's target market. Fortunately, the ads are tastefully and discreetly displayed and usually consist only of the company logo and a picture of the product; users may click the ad for more information.

But who cares about advertisements when there's free E-mail to be sent? Juno's point-and-click interface is well-organized and highly intuitive. Another benefit to the user is that the application operates offline until you want to check for mail or send a message. The modem then dials and connects to the Internet through one of more than 200 nationwide connection points (or an 800 number if no connection point exists in your locale), sends or retrieves the message, and disconnects. The entire amount of time that you actually spend online is usually less than 10 seconds. The address book and spell checker are two additional features that distinguish Juno as a user-friendly E-mail application.

The only shortcoming we discovered while using Juno was that it could neither send nor receive attached documents and files. For most home users, this isn't a problem. The average business user, on the other hand, will probably have to find another E-mail service to handle the electronic messaging load.

Finally, the chances of Juno's survival have caused some concern in the online community. An ad-driven Internet service is an old idea, but this is the first instance of it actually being put into widespread effect. Whether it will last remains to be seen.

For More Information:

(In the United States only)
Juno Online Services, L.P.
(800) 654-5866
signup@juno.com ●

The Flipper Files

A dolphin is a dolphin is a dolphin, right? Wrong. *Dolphin Encounters* from CD-ROM Studios introduces you to the 13 Atlantic bottlenose dolphins living at the Dolphin Research Center (DRC) in Florida. (The DRC is a not-for-profit education and research facility.) There are biographies, still photos, and film clips of each dolphin. You even can listen to each dolphin's unique signature whistle and see a clip of one dolphin painting by holding a brush in his mouth.

The Training section shows how trainers work with dolphins by using hand signals. There's also an extensive Library section containing information on all aspects of dolphin life, from how they breathe and communicate to marine mammal laws. The Library contains information about some of the special programs at the DRC, such as one in which dolphins help disabled children learn. You also get information about programs at the DRC that are open to the public or about how to get a job there.

If you're interested in the biology of the dolphins, there's a three-dimensional model that shows internal and external views of the dolphin's anatomy. You can click parts of the dolphin to read about their functions.

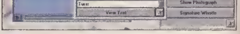
There's also an interactive quiz game that can be played solo or with a few friends. The quiz tests your knowledge of dolphins and throws in some environmental issues affecting them, too. The answers to the quiz questions are scattered throughout the program, so after you explore the program, you can see how much you've learned.

The DRC even includes a section that helps you write to legislators about issues concerning dolphin protection and the marine environment.

Devoted dolphin fans will find this program full of information and entertainment. The video clips of the dolphins are probably the most exciting part of the program. At a suggested retail of $59.95, all of which goes to the Dolphin Research Center, it's certainly cheaper than taking a family vacation to Sea World!

For More Information:

Dolphin Encounters
CD-ROM Studios
(803) 853-2001 ●



TURSI

Tursi is an extremely specia
dolphin family. she was the first s
here at Grassy Key. Tursi was bo
daughter of Little Bit and Mr. Gip
the original "Flipper" movies. Tu
preserve the Royal Flipper Linea
June, 1990 to Talon. DRC's first

Nicknamed "Whopper." Tu

Facts

Sex
Female

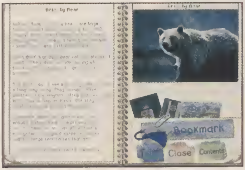
Date of Birth
11-28-73

First arrived at DRC
Birth

Parents
Little Bit/Mr. Gipper

The *Dolphin Encounters* CD-ROM offers detailed biographies of each dolphin, including photos and video clips.

Beware Of The Bear



If you can "bear" it, explore the Guidebook to read up on Yellowstone National Park's natural wonders, wildlife, and plant life.

Can you tell the difference between a venomous rattlesnake or a plain old bullsnake? How about a geyser and a fumarole? Why are some areas moist and fertile, but others dry and barren? *Explore Yellowstone* answers these life-science questions and more within the borders of one of the world's most amazing natural wonders: Yellowstone National Park. Explore Yellowstone is part of a series of Discovery Learning products by MECC for children ages 8 to 14.

Before you explore, get a feel for the park through the built-in Guidebook, which is full of multimedia options. Listen to the call of a wolf. View a video of the Old Faithful geyser erupting. Or, watch an animation illustrating how clouds and rain are created in mountainous areas. To ease navigation, the 3,500-square-mile park is split into regions that you can explore via a virtual jeep. Hop in to enjoy the view or play learning games. The program makes it easy to forget that you're learning as you identify plants and animals, perform experiments, and answer visitors' questions just like a real park ranger. In each region, you earn badges, working your way up from Junior Ranger to Park Ranger to Head Ranger.

The program offers two benefits. Not only can you learn about life science through interesting games and multimedia clips, but Explore Yellowstone also serves as a great resource for someone preparing a trip to the world's oldest national park. You'll learn about what you'll see or where to find certain animals before you get there. The program is interesting, offers hours of material, and is hard to quit before you earn "just one more" merit badge. Some of the challenges are formidable enough for an adult, but the material occasionally left a few unanswered questions. In addition, video clips and sound clips will never take the place of visiting the park.

We suggest a computer with 256 colors, sound card, and speakers to take advantage of all the photos and features. Explore Yellowstone is available on CD-ROM for Windows and Macintosh for about $30.

For More Information:

Explore Yellowstone
MECC
(800) 685-6322 ext. 529
(612) 569-1529
(800) 663-7731 in Canada ●

Independent Study In Piano

Listening to someone tickle the ivories can inspire others to learn to play. But, nothing is ever as easy as it sounds, and playing the piano is no exception. The endless hours of "Mary Had A Little Lamb" drag on forever while you learn finger placement and form, then you move on to chords, keys, rests—all drilled in through repetition. Sorry, there's no easy way around that, but the *Piano Discovery* system ($199 for software, keyboard, and connecting cable; $59 for software only) can help you learn a few basics on your own and in your own time.

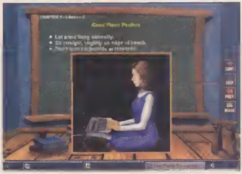
Piano Discovery starts at the very beginning with correct hand posture and placement of your fingers on the keys. The only problem is the computer has no way of knowing whether you're following its careful instruction. The software will, however, suggest you repeat a lesson until you get the song or phrase perfect. It will even slow down and simplify the piece until you can warm up to the original lesson again. But the computer can't notice that you played the F with your third finger instead of the fifth. You need to be self-motivated to really learn how to play using this software. It may work better for adults than children who are more interested in playgrounds than piano lessons.

The lessons are accompanied by a Practice Room, which provides an environment for voluntary repetition. The Practice Room grades your performance, but it doesn't point out specific errors. An arcade features games that help you practice and enhance some basic skills without the frustration of sheet music and critiques. There is also a recording studio and a concert hall where students can perform and personalize a little of what they've learned. Finally, a Jam Session rounds out the application with a place for students to experiment with music skills and throw in creative touches.

Piano Discovery is an excellent beginner's program to teach the basics of music and piano, but there is just no replacement for the personalized care of a human piano teacher, complete with cookies and milk.

For More Information:

Piano Discovery
Jump! Software Inc.
(800) 289-5867
(415) 917-7460 ●



***Piano Discovery* provides instruction on posture and hand position as well as the basic note tutorials.**

Epson Offers Easy-To-Use Scanning

Setting up and configuring the easy-to-use ActionScanning System II from Epson is a simple project.

As we unpacked the Epson ActionScanning System II at the offices of *PC Novice*, you could feel the excitement in the air.

We don't get out much.

In our own defense, however, a good scanner can offer some exciting options to anyone who has the time and patience to learn how to use it. You can scan images for use in electronic or print mediums, scan pages of text and convert them into word processing documents, or even create wacky personalized wallpaper for your PC.

The folks at Epson pitch the ActionScanning System II as a good scanner for the first-time user. They promise easy setup, configuration, and use. They deliver.

The scanner includes a bidirectional parallel interface card, so you don't have to give up your only parallel port to use it. We had the card plugged in, and the scanner connected in just a few minutes. The documentation was helpful during the setup, and we had the scanner ready in about half an hour.

The manuals also made scanning our first image simple. The scanner's *Image In* software offers either an easy or advanced method. First-time users will opt for the easy setting until they get comfortable enough to explore other options.

The software also offers plenty of tools for manipulating images after scanning. With some practice, you can get pretty good at cleaning up your pictures.

We ran into trouble once with the text-recognition software. The scanner comes with OCR (optical character recognition) and special text-enhancement technology for scanning typed material. However, the manuals failed to give more than a passing mention to these functions. We had to find the software's Readme file to learn the ropes. Once we figured it out, it worked pretty well.

We found a number of uses for the ActionScanning System, and so could its targeted buyers, the folks who run small or home-based businesses. The $499 price tag, though pretty good for a quality scanner, still isn't exactly cheap.

For More Information:

ActionScanning System II
Epson
(800) 463-7766
(310) 782-0770 ●

UPStart Keeps Power Flowing

At best, power outages turn productive PCs into paperweights awfully fast. At worst, vital data can be lost forever if the juice gives out at the wrong moment. Whatever is stored on the hard drive will likely survive, but the contents of the computer's short-term electronic memory—RAM—is wiped clean.

Uninterruptible power supplies aren't at the top of most peoples' peripheral wish lists, but as the value of information in a computer's memory rises, their importance grows exponentially. The new UPStart by SL Waber Inc. combines virtually all of a PC's electrical needs in one package: enough battery power to keep most systems alive for at least five minutes, a heavy-duty surge suppressor, a modem protector, and a power center with conveniently located switches. The whole unit fits under a monitor to save desk real estate.

The UPStart includes two battery-backed outlets meant for the computer and the monitor. Three other outlets are not battery-powered but are surge-protected. A master switch on the front controls the whole setup. The device also includes a handy little grounding panel on the front of the unit that users can touch whenever they feel the need to be grounded.

The UPStart comes with *Electronic Bookmark*, a program designed to run in the background on the protected PC and pop up in the event of a power failure. Once it's properly configured for all of the programs you use, the Electronic Bookmark is able to sense what applications are open and automatically save all information on the screen to the hard drive before shutting everything down. This type of software is invaluable for unattended crises.

We set up the UPStart in just a few minutes. The outlets on the back of the power supply were clearly marked, and the Electronic Bookmark software loaded without incident. Pulling the plug simulated a quick power failure that UPStart dealt with admirably.

UPStart's $180 street price is a bit steeper than similar rival brands, but the price covers not only the UPS but also the Electronic Bookmark shutdown software. Usually such software is an optional and costly extra. For users with important data and a need for peace of mind, UPStart is worth a look.

For More Information:

UPStart
SL Waber Inc.
(800) 634-1485
(609) 866-8888 ●

HOMESCHOOLING

Does Your PC Have A Mind Of Its Own? Here's How You Can Take Control...

BY CLARK PARKER

If you're like me, you probably look at your computer with equal parts awe and incomprehension.

Sure, the possibilities seem limitless, but it sometimes seems as if just switching your PC on requires advanced education. You can read the operating manual, but more often than not it seems to have been translated from Japanese to English by someone who knows only Swahili.

Go to your local bookstore, and you'll find hundreds of books — all written for somebody else's software. Of course, most computer manufacturers offer telephone helplines as a solution...if you don't mind sitting on hold for forty minutes and then forgetting the question you meant to ask, that is.

International Correspondence Schools of Scranton, Pennsylvania has developed another option. It's called *distance education,* and for thousands of men and women around the world it's become the best way to learn the intricacies of computer hardware and software without having to go to class.

The way distance education works is simple. You enroll in the course that best suits your needs — anything from Desktop Publishing to an Associate in Specialized Business Degree in Applied Computer Science. Once you enroll, the school sends your instructional materials to your home or office. You get lessons, books, software—whatever you need to complete your course. Lessons are presented step by step, and most courses can be completed in less than a year. A Degree takes a little longer, but you can still come away with a four-semester Degree in as little as two years.

What most people like best about distance education is its convenience. Unlike a college class, you have complete control over when, where, and how long you study. There's no time spent traveling to and from class, and your "class schedule" is as flexible as you are. Plus there's no waiting for other students to catch up or wishing the instructor would slow down. You move at your own pace. Exams are given on an open-book basis, which means you can be sure you've mastered the concepts rather than memorized the answers.

The courses are usually designed to provide students with the expertise to enter or advance in computer careers. In fact, thousands of students have used their training to secure promotions, pay raises, and even start whole new lives in computer career fields from Programming to PC Repair. And even if you just want to master the PC for your own enrichment and enjoyment, you can be confident that each training program provides up-to-date and comprehensive instruction.

All the information is presented so that even students who don't know a floppy disk from a soggy pizza can easily absorb every detail. Beginners love distance education because everything is presented in a logical, step-by-step format. There's no confusing "techno-speak," and you get plenty of hands-on experience. And even though courses are easy to understand and complete, they're so informative that even computer experts will learn something (and usually *several* somethings) they didn't know before.

But just because you study at home, on your own schedule, doesn't mean you're alone. ICS, for instance, has a large support staff at their headquarters, including expert instructors who are available to answer questions by toll-free helpline, as well as via the ICS site on the world wide web (http://www.icslearn.com).

Of course, ICS isn't the only distance education school out there, though it is the largest and most experienced in the world. You should compare ICS with other programs to make sure you get instruction that's right for you. The following chart shows a few of the differences between ICS and its leading competitor:

HOMESCHOOL CHECKLIST	**ICS**	**Leading Competitor**
Students Enrolled	**250,000**	55,000
Total Courses Available	**59**	30
Number of College Degree Programs	**11**	None
24-hour Student Helpline	**Yes**	No
Payment Plan Available	**Yes**	Yes
Finance Charges on Payment Plan	**None (0%)**	8%

ICS currently offers Career Diploma Courses in such computer specialties as: Computer Programming, Personal Computer Specialist, PC Repair, A+ Certification Test Prep.*, Desktop Publishing & Design, Computer-Assisted Bookkeeping, Small Business Management, and Personal Computer Fundamentals*. You can also get your High School Diploma through ICS, or choose a Career Diploma course in a non-computer career field, like Electrician, Medical Office Assistant, Dental Assistant, Professional Locksmithing, TV/VCR Repair, Legal Assistant, and Appliance Repair. You can even earn an Associate in Specialized Business Degree by choosing Applied Computer Science, Accounting, or Business Management. Get an Associate in Specialized Technology Degree in Electrical Engineering Technology or Mechanical Engineering Technology. Every ICS Degree Program offers computer training.

* For personal enrichment only

FOR MORE INFORMATION, you can contact ICS directly by calling toll free **1-800-595-5505, Ext. 1134** Write to International Correspondence Schools at Dept. AA5S76S, 925 Oak Street, Scranton, PA 18515 or contact ICS on the Internet World Wide Web address at http://www.icslearn.com

The school will send you FREE information and a color brochure about the training program you're most interested in. There's no obligation, so contact ICS today!

812XC

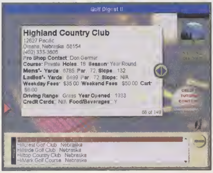
Teeing Off Away From Home

Most weekend duffers find the best golf courses in their area long before they master the intricacies of the sand wedge. But planning a golfing vacation can be more frustrating than a double bogey if you don't know much about the courses you're thinking of visiting.

Golf Digest's Best Places To Play from Creative Multimedia provides avid golfers with information on 14,000 courses nationwide. This CD-ROM uses text, slides, video, and Web-like links to help users find information about nearly any U.S. course.

Hosted by professional golfer Fuzzy Zoeller, the program tees off from a table of contents that has information about the best courses to play, a nationwide golf course directory, Golf Digest's "Best 18 Holes You Can Play," profiles of course architects, a trivia game, and information about Golf Digest's schools.

The list of the best golf courses and the course directory are the program's best features. Although the title "Best Places To Play" may have golfers thinking more about green fees than putting greens, Golf Digest caters to more than just the Polo shirt crowd. Courses are listed as Super Values, Frugal Picks, Best Public Courses, Best Resort Courses, and Best New Courses. The user also can search for golf courses by state, green fees, and by Golf Digest's rating system. Information about each entry includes the address and telephone number, green fees, course information, and types of credit cards accepted. Some entries are accompanied by full-color pictures or video (or both) of the course.



Highland Country Club
12627 Pacific
Omaha, Nebraska 68154
(402) 333-3606
Pro Shop Contact Don Germer
Course: Private **Holes** 18 **Season:** Year Round
Mens'- Yards 6785 **Par** 72, **Slope** 132
Ladies'- Yards 6499 **Par** 72 **Slope:** N/A
Weekday Fees: $35.00 **Weekend Fees** $50.00 **Cart:** $6.00
Driving Range Grass **Year Opened:** 1933
Credit Cards N/A **Food/Beverages** Y

Hillcrest Golf Club Nebraska
Hillside Golf Club Nebraska
Hilltop Country Club Nebraska
HiMark Golf Course Nebraska

***Golf Digest's Best Places To Play* lets you search for information about 14,000 golf courses in all 50 states.**

Other features of the program have less practical use but are entertaining. The profiles of top course architects and the magazine's "Best 18 Holes" probably will only interest the most hard-core golfer.

The program's only disappointing feature was the text that accompanies some of the features. On our copy, much of the text was garbled, making it difficult to read. Fortunately, this doesn't affect the information about the golf courses.

Despite this rather glaring imperfection, this program, for about $30, is ideal for golfers who want to take their game out of their own backyard. ●

For More Information:

Golf Digest's Best Places To Play
Creative Multimedia
(800) 262-7669
(503) 241-4351 ●

Breaking Ground Without A Shovel

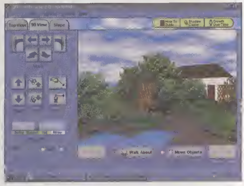
Whether it's designing property for a new home or redesigning after the kids grew out of their jungle gym, Books That Work's *3D Landscape* will benefit anyone who doesn't want to tear up their yard until they're sure of what they want to do with it.

When you open the program, you can take the Five-Minute Tour, open a sample landscape, or start your own design. Taking the Five-Minute Tour and exploring the sample landscapes will give you ideas for your own designs; using the QuickStart program for your first few creations will help you learn the program faster than if you relied solely on the meager printed documentation.

Objects are placed by dragging them from the binder and dropping them onto the canvas, and many can be resized and reshaped. Trees, shrubs, and plants are selected from a database containing 800 varieties of plant life and can be searched by name, sunlight available, flower color, bloom season, height, usage, etc. At any point, you can "walk through" the design by clicking the 3D View tab.

For $59.95, the program did have some shortcomings. Landscape designs are hindered by the apparent lack of a snap-to-grid command (which could help users draw straighter lines and execute better object rotations) and overly large object handles that make it difficult to connect or layer objects in all but the most magnified view. Additionally, an exorbitant amount of time was wasted while the screen was redrawn whenever a design was edited, clicked, or scrolled through—even though the program was running at its optimal settings.

This company also produces the *Garden Encyclopedia* 2.0 ($29.95, street), which provides a searchable database of 2,000 varieties of plants and information that can be exported into 3D Landscape. The two programs can be ordered from the company as the *Gardener's Two-Pack* for $69.95.



After creating a landscape design, you can walk through it in 3-D mode.

For More Information:

3D Landscape
Books That Work
(800) 242-4546
(415) 326-4280 ●

NICE TRY but...

Say . . . "EIZO"

Usually when companies make a change, they strive for something better. Nanao USA Corp. missed the mark this time. The makers of FlexScan monitors have been plagued for years with mispronunciations of their name. So they've finally decided to change it to something that rolls off the tongue much more smoothly—EIZO.

Renaming the corporation EIZO (pronounced "AY-zo") Nanao Technologies Inc. will globalize the company and should clear up any problems with spelling and pronunciation, according to the company's press release. At least after the employee-proposed programs to ship out special EIZO pronunciation guides get underway.

As Jannet Quintana, a member of the EIZO Nanao sales support team (obviously someone used to dealing with name misspellings and garbled pronunciation), puts it, "I've heard about every mispronunciation possible of the Nanao name. But we've counted, and I think EIZO can only be pronounced about three different ways, and that itself is a tremendous step forward."

Or, at least a small step sideways.

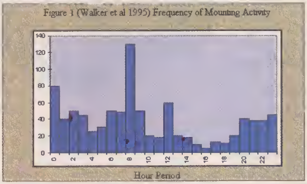
Nectar Of The Nerds

According to the Wheaties marketing rationale, eating the flaky breakfast cereal puts us on the road to being a world-class athlete like sporting spokesmen Bruce Jenner and Michael Jordan. If the marketing logic holds up, that means drinking Jolt Cola is the first step to becoming a reclusive, jittery nerd chained to a computer desk.

The legions who prefer computerized realities and cold pizza to athletic pursuits and grainy flakes should be buzzing about the recent announcement that Jolt (known for offering twice the caffeine of other colas) "has been crowned king of soft drinks by the software development community." That's right. The folks that successfully lent their image to pocket protectors and Friday nights at the keyboard have endorsed a cola. Virtual reality developer Forte Technologies recently entered a promotional deal with Jolt, a pairing that Jolt President C.J. Rapp says was inevitable.

"Virtual reality and Jolt Cola belong together," Rapp says. "By offering consumers a unique, high-intensity gaming experience and an explosive level of soft drink satisfaction, gamers will never want to leave their virtual worlds."

Hmmm. Quaffing an explosive drink and living in an alternate reality. Does Dr. Jekyll's agent know about this custom-made endorsement opportunity?



This graph depicts the hours when cattle activity was higher or lower, letting a dairy farmer determine what factors contributed to a cow's liveliness.

Smart? Wine

Smart Wine Magazine hopes some computer users are looking for a drink that gives them a little more kick than even Jolt can provide. The online magazine (http://smartwine.com) attempts to offer an antisnob, hip look at "Real Wine For Real People." The magazine aims at a younger generation of winos, featuring a Dirty Harry quote (inaccurate, by the way—"Are you feeling lucky? Well, are you, punk?") on their home page and some way-out articles. Topics include:

- Drinking habits of infamous dictators. (Get plowed and imagine that you're Stalin on a "binge and purge.")
- Wine matches for fast and frozen foods. (Of course you need the white wine with your Salisbury steak TV dinner.)
- A look at wineporn on bottle labels. (Hey, it's not only a refreshing, alcoholic beverage; it's softcore entertainment, too!)

"Smart Wine is wine for the way we really live," says the magazine's President Lewis Perdue. "No twisted foo-foo language—just good, solid, relevant information so people can get the best bottle of wine for the best price."

In the actual words of Dirty Harry, we have to say to *Smart Wine*, "You're a legend in your own mind."

Glad Cow Disease

Though cattle raisers in Great Britain were recently concerned with the status of mad cow disease and the future of the cattle industry at home and abroad, dairy farmers in the United States have been looking at a different end of their animals.

Two innovative companies, Web developer O.N.E. and DDx, have teamed up to bring farmers an Internet update about the nightly activities of their cows in an effort to help them determine which animals are in heat. The HeatWatch System transmits information to DDx from a sensor attached to the end of a cow that registers data when the cow is mounted. The company then processes the information and returns it to the customer via the Internet.

"This is an excellent example of how the Web can combine with other technologies for powerful and innovative applications," says Steve Weaver, the vice president of marketing and sales at O.N.E. "We're glad to help dairy farmers keep their cows producing and providing more bang for the buck."

It only goes to show that everyone is finding a place on the World Wide Web. You can shop at home, speak to friends across the world, play interactive games with people you've never met, and find out why the cows aren't coming home. ●

DEFRAG Fixes Hard Drive Clutter

Imagine how hard it would be for you or your secretary to find a document in your office if parts of letters and files were randomly placed throughout your filing cabinet instead of in logical order. To make your filing system efficient, you would need to organize the files so that all the pages of a given file were in a folder together, where you could find them easily.

DEFRAG, or the Disk Defragmenter, is a DOS tool that neatly arranges the files on your computer's hard drive so that DOS can find them quickly. It does this by moving your files into adjoining areas on the disk, making them easier to access than if the files were scattered randomly throughout storage.

NOTE: DEFRAG is only included in MS-DOS 6.0 and newer. Before then, it was available as a Norton Speed Disk utility from Symantec.

How Drives Store Data

To understand how DEFRAG works, you need to know how drives store information. DOS divides files into pieces, each of which is contained in its own disk sector. (A **disk sector** is the smallest storage unit of a disk, usually capable of containing 512 bytes of data.) As files are deleted, gaps form where the deleted files were located. As you add information to existing files and create new files, DOS will stick these new file pieces in the gaps before using the **contiguous** (physically connected) empty sectors at the end of the disk. This means that data added to files may or may not be physically next to the rest of the data from that file, and new files may be split to fill several noncontiguous holes.

A file that is stored in two or more disk areas that are not contiguous is a **fragmented file**. DOS keeps track of the locations of all of these file fragments and can read a fragmented file, but as more and more pieces of files are separated physically from each other, fragmentation makes your drive slower to access that information. The reason for this slower access time is that the **read/write head**, a device that reads information from the disk, must move to each place on the disk where the information is found. Defragmenting the drive reduces both the time required to access files and the wear and tear on the read/write heads on your hard drive.

Also, fragmented files are harder for you to recover if you accidentally delete them. Undelete and Unformat (the two utilities that will help you recover files) work much better on unfragmented files.

A Word Of Caution

DEFRAG is meant for use with uncompressed drives. (**Disk compression** is the process of reducing the amount of disk space required to store a file.) If you try to run DEFRAG on a drive compressed with the DoubleSpace utility, DEFRAG will pass the buck to DoubleSpace, which contains its own DEFRAG utility. This won't cause a problem, but it can be startling if you're suddenly not in the program you expected. If you compressed your drive using a third-party software package such as *Stacker*, use the defragmentation utility included with that software to defragment the compressed drive.

Choose a time when you can afford to be without your computer for a while to run DEFRAG. While it can take only a few seconds, it also could take as long as a few hours, depending upon several factors such as your hard drive size, your computer's speed, and the optimization option you choose. (There is a way out if you start DEFRAG and then desperately need to use your computer. Just press ESC.)

Before running DEFRAG, close all programs, including Windows. You must run DEFRAG from DOS, not from the DOS prompt in Windows. You must also exit the DOS Shell because the Task Swapper leaves disk files open, as Windows does. DEFRAG could accidentally overwrite any open files.

NOTE: Windows 95 users have a slightly different version of the Disk Defragmenter. To get to it, choose Programs from the Start menu, then choose Accessories, then System Tools, and finally, left-click Disk Defragmenter.

You also should recover any mistakenly deleted files (using Undelete) before running DEFRAG because once DEFRAG has rewritten files to the disk, you won't be able to recover previously deleted files.

Next, check for lost **allocation units** (groups of disk sectors) on your hard drive by typing the following:

Writing Contest Results

You may remember in our March issue some big, purple words printed in this spot that stated, "Writing Contest." We asked you to tell us about yourself, how and where you learned about **PC Novice***, why you subscribed, and why you would recommend* **PC Novice***.*

We have chosen three essays (let us tell you, it wasn't easy!) that contain unique experiences with **PC Novice** *magazine. The additional two essays will appear in this spot, so keep a watchful eye for the next few months! We want to thank all of you for entering our contest and giving us a chance to get to know you better. Now, we would like to introduce David Rogers, a new subscriber from Anchorage, Alaska.*

Months ago I began a tedious exploratory step, venturing into the "PC" jungle, hoping my effort would result in having a "trophy" for the computer room. My safari began and ended in acute frustration within a local computer store. I soon discovered a room full of machines with several common factors: they all cost a lot of money, looked very complicated and left me completely confused. Panic started to set in as I looked for the nearest exit.

At that moment, a salesperson materialized and asked if he could help. With my mind reeling from this inhospitable land, honesty seemed to be the best policy under the circumstances. I found myself confessing to this stranger my complete ignorance and lack of understanding regarding the computer world. Yet I still wanted to purchase a PC. It was then that I saw the transformation of salesman to witch doctor. I could even hear a faint drumbeat in my ears. His lip curled up with disdain as he began to chant "computer jargon"-related questions that left little doubt in my mind that he had failed to hear me properly (perhaps he, too, could hear the drums).

I was asked about RAM, CPU speed, Windows 95 or DOS, CD-ROM drives, gigabytes, megabytes, fax modem kilobits, and whether I planned to enter the "New World" of the Internet. I felt dumber than a rock, undeserving to be allowed to purchase such a complicated machine, and certainly not able to operate it. During those long minutes of my salesperson's "PC Quiz," I felt myself turning into mush, unable to speak, as if a spell had been cast upon me. It was the "You Are Stupid" spell.

My only recourse was to escape through the front door and try to regain some value as a human being in the parking lot. My world was shattered, but at least the drumbeats had ceased the moment I left the computer store.

As I headed for home in utter defeat, feeling as useless as a 286 with one too many power surges, a small flame began to flicker deep inside me. I needed to formulate a course of action and learn enough about the "computer world" to pass the next test and be allowed to take one home. No more would I be mentally reduced by a salesperson, dressed down like a mere child and sent out of the store with a dunce cap, upon my head. I vowed to learn enough to start upon the path of the computer hacker.

A friend of mine knows a lot of "stuff" about computers, so I drove over to his house and asked him for assistance. Well, he did his best, but I soon realized that it had been a long time (15 years in fact) since he had been in my shoes. Consequently, his conversation —for the most part—was over my head. I found the prolific advice going in one ear and out the other. My dunce cap was still in place.

So, it was back into the vehicle and homeward bound for me. Heigh-ho, heigh-ho! I could see that this new

continued on next page

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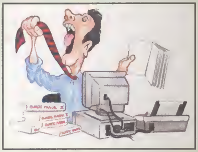
Personal Message:

plan of mine was going to take some fine-tuning. Wisdom was not attainable through my friend, nor was it going to be all that easy. I needed something more basic to lead me along the path and through the peaks and valleys of the computer world.

Stopping off at my local grocery store to get some ice cream to settle me down and soothe my nerves (ice cream has medicinal qualities, you know) I turned the key that opened the door to the world of Bill Gates and Windows 95.



By chance I went down the magazine aisle (or perhaps fate had pulled me in that direction, as it was a long way around to the ice cream freezer section and I did know of a much shorter path). When I reached the magazine racks, I glanced over and quickly noticed the computer magazine section. There were a lot of them sitting there, some at my feet, others above my head. As I scanned the rows of bright-colored front covers, one located on the third level by my left knee seemed to speak to me. I felt an electric charge of excitement course through my body when I read the title: ***PC Novice.*** My mind quickly reasoned "**PC**" stood for Personal Computer, and "**Novice**" was now my middle name.

Once home with my new friend and a bowl of "medicine," I quickly opened the cover of **PC Novice**, and found article after article of information written at my level. The magic was that each article was about a subject I was facing right then. In moments I realized this magazine was the answer, IT WAS THE POWER. I now had a launching pad directly into the computer world. The straightforward information I found reading page after page gave me a sense of new direction. I quickly filled out the subscription card and mailed it in. I needed more **PC Novice** input fast!!!

Just three issues later I felt able to cope and ready to try and purchase my first computer. In fact, my third magazine, the March '96 issue, contained an article on page 43 entitled, "How Much Pc Do You Really Need?" With that information, I felt the might to create the spell that would hex my next witch-doctor salesperson, and silence the drums.

Today, I walked into a custom computer store (no off-the-shelf, brand-name computer for me) and I ordered a PC built to my specifications. A 133MHz Pentium with a 17-inch monitor, 16MB RAM, 28.8Kbps fax/modem, and an eight-speed CD-ROM drive—a multimedia creation of wonder and might.

My new computer is sitting here in the computer room watching me type this letter on my old Panasonic word processor (I should have asked that nice salesman, my new friend, how to turn it on). But not to worry, next month it would not surprise me to read in **PC Novice** an article titled: "How To Start Your PC." In fact, I'd almost bet on it. After all, **PC Novice** is written for me and happens to be the best thing since spliced compliant cables.

David L. Rogers,
Anchorage, Alaska

Congratulations David!

We knew many of our subscribers could relate to your computer experience! Now, you will be sporting a new PC Novice T-shirt and learning even more about computers with six of our "Guide To" series issues!

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Be sure to watch for additional essays in this spot within the next few months!

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```
chkdsk /f
```

at the command prompt and pressing ENTER. If DOS finds any lost allocation units, it will tell you how many it found and how many chains the lost allocation units were in. It will ask whether you want to convert the lost chains to files; press *Y* to save the information that's in those chains.

Now you're ready to start DEFRAG. To do so, type

```
defrag
```

at the prompt and press ENTER. (If you want to defragment a drive other than the current drive, include the drive's letter in the command: **defrag c:**.)

If you want the files arranged in a particular order, add the /S switch followed by the letter for the sorting method you want. The options are:

n	alphabetically by name
n-	reverse alphabetically (Z-A)
e	alphabetically by file name extension
e-	reverse alphabetically by file name extension
d	by date and time, starting with the earliest
d-	by date and time, starting with the most recent
s	by size, smallest to largest
s-	by size, largest to smallest

For example, if you wanted the files arranged from largest to smallest, you would type

```
defrag /ss-
```

and then press ENTER. (The way you have DEFRAG arrange the files won't affect access time; it's just a matter of personal preference.) If using these switches is a little too intimidating, just use the basic DEFRAG command and make the choices within DEFRAG once it's running. The Optimize menu contains these options under File Sort.

You also can add the following switches to the DEFRAG command:

/f	defragments files and consolidates all empty space at the end of the disk
/u	defragments files but leaves empty spaces alone
/v	verifies that files have been rewritten correctly if they were moved
/b	restarts the computer after DEFRAG has run

The first two switches are also options available in the Optimize menu after you start DEFRAG; /F is the same as choosing Full Optimization, and /U is the same as choosing Unfragment Files Only. (We'll talk more about each of these options later.) The last two switches, however, aren't found in the Optimize menu, so if you want those actions to take place, you must add the appropriate switch to the command.

To keep your system from getting bogged down with fragmented files, run DEFRAG once each week or once each month.

When DEFRAG starts, it will display a list of the drives on your computer. Use the Up arrow or the Down arrow to select the drive you want to defragment and then press ENTER. DEFRAG will analyze the data stored on that drive and recommend a defragmentation option.

If DEFRAG finds that your drive really is already in good shape and doesn't need to be rearranged, it will tell you "No Optimization Necessary." Your only option at this point is to select OK and press ENTER. The Optimize menu will open; from there, you can exit DEFRAG, optimize another drive, or change the optimization settings.

If the drive only needs a small amount of tidying, as ours did, DEFRAG suggests that you "Unfragment Files Only." (This means DEFRAG will consolidate the fragmented files on your drive but will still leave gaps between the files.) If, however, your drive is in worse shape than a teen-ager's bedroom, DEFRAG will recommend "Full Optimization." (This means that DEFRAG consolidates files and sends the empty spaces to the end of the disk. This option may take hours. It's best to do this at a time when you can do without the computer for several hours in a row.)

DEFRAG knows its job, so we recommend that you follow its suggestion. To begin defragmentation, press ENTER or click Optimize. (If for some reason you want to choose an optimization method other than the one DOS recommended, click Configure to open the Optimize menu. Select Optimization to choose between Full Optimization and Unfragment Files Only. You can also Select File Sort to choose how to sort the files; the choices are the same ones for which we listed switches above.)

As DEFRAG cleans up your drive, you can watch the process on the disk map that appears on your monitor. The map shows the status of each sector, using symbols. A legend at the lower-right corner of the dialog box explains what the symbols mean. For example, a dot means that sector is used, while an *X* means that sector is unmovable.

When DEFRAG has completed its task, it will give you a "Finished condensing" message; press ENTER to continue. It then will tell you that optimization for the drive you specified is complete. You can choose at this point to optimize another drive by clicking Another Drive, open the Optimize menu by clicking Configure, or exit DEFRAG. Use the Right and Left arrow keys to highlight your choice and press ENTER.

Unless your disk needed little or no optimization, you'll probably notice that files and programs load more quickly. To keep your system from getting bogged down with fragmented files, run DEFRAG once each week, or once a month if you don't use your computer as often. If you didn't need to run DEFRAG, you won't have hurt anything, and you won't have spent any significant time doing it. If your disk did need tidying, doing it often will keep the amount of time DEFRAG takes from getting out of control. Now, if only it were that easy to organize the mess in your filing cabinet! ●

by Diana K. McLean

Working With
Windows 3.1 Program Groups

The Program Manager is Windows 3.1's way of organizing your software collection. With its program groups, it can be compared to a set of diskette storage boxes, each of which contains the diskettes for programs related in some way. The boxes are all neatly labeled, but over time, some become too crowded, creating a need for more. (Windows creates several groups upon installation. Although each group can hold up to 40 program items, most people prefer to keep their groups smaller than that.) You also might create a new group if some programs on your computer aren't represented in Program Manager. For example, many DOS features such as DriveSpace aren't in a program group. Consider creating a group for these if you use them regularly.

New Groups And Program Items

To create a new program group, open the File menu in Program Manager and click New. When the dialog box appears, Program Group should have a black dot in the button beside it. If not, click the button to place one there. Click OK to go to the next screen. There, you'll be asked to type a description of the group, which becomes the label for the program group icon. Type it in and click OK. You don't need to enter anything in the Group File box; Windows creates and names the file for you.

To change the name of an existing program group, click the icon for that group, then choose Properties from Program Manager's File menu. The Description line will be highlighted; type in your new name for the group and click OK.

To place a program in a group, click the group icon you want to place the item in. Then, open the File menu and click New. When the New Program Object dialog box appears, click the button in front of Program Item and click OK. This opens the Program Item Properties dialog box. On the Description line, type what you want as the label of the item. (We suggest using the program's name.) By Command Line, enter the path to the program file. If you don't know the path, click Browse to search a directory tree and click on the file name. The next line, Working Directory, is optional. You can leave it blank, and Windows will fill it in with the directory containing the program file you selected. The last line, Shortcut Key, lets you designate a key combination to activate the program. Finally, select Run Minimized if you want the application to be reduced to an icon every time it starts. (You may use this feature with a program such as Print Manager, which does its job without direct input from users.) Click OK, and Windows will create the program item icon.

Moving And Removing

To move a program from one group to another, click the icon for the program you're relocating, hold down your mouse button, and drag the icon to the group you want it moved to. (If it matters where in the new program group the program is sent, open the destination group window before dragging the icon to the new group and just drop the icon where you want it.)

At some point, you may find that you no longer need a certain program group. This is most likely to happen when you delete a program from Windows using File Manager instead of an **uninstall utility** included with the program. (Uninstall utilities usually remove the program icon and program group if either of these were created by the program when it was installed, and not by you.) Removing programs using the Delete command in File Manager doesn't remove the program's icon or a program group associated with that program, even if that program is the only one in the group. This leaves you with a program group equivalent to a ghost town. You also may find yourself in this position if you move programs to different groups, leaving one group empty.

To delete an empty program group, click once on the icon for the group. Open the File menu in Program Manager and click Delete. You'll get a cautionary dialog box asking if you're sure you want to delete the group. Click Yes. (You can use the same technique to delete an item from a program group; just click the item you want removed instead of the group icon.)

If you accidentally remove a program item or group icon for a program still on your system, it won't take the program with it. You'll just have to re-create the program group. To do this, follow the steps above for creating a group and placing a program in it. ●

by Diana K. McLean

Making Windows 95 Easier On Your Eyes

When you were a kid, your mother constantly told you that sitting too close to the TV was bad for your eyes. Now, as an adult, you find yourself leaning close to your computer monitor and wondering whether your mother would give you the same lecture if she saw you.

Just like watching TV too closely, using a computer can be hard on your eyes. You may want to change the look of your computer display to provide easier reading, particularly if you have any visual impairment, whether it's nearsightedness or color blindness.

The Accessibility Options area in Windows 95 offers two ways to make your computer easier on your eyes: increasing the level of contrast on the screen and increasing the size of print on the screen. To use the Accessibility Options features, go to the Control Panel. (You can reach the Control Panel by double left-clicking the My Computer icon and then double left-clicking the Control Panel icon, or by left-clicking Control Panel in the Start menu's Settings section.) Once you're in the Control Panel, double left-click the Accessibility Options icon.

Contrast Level

Raising your display's visual contrast level can make it easier to read. To make your display high-contrast, left-click the Display tab in the Accessibility Properties window and place a check in the box next to the words Use High Contrast by left-clicking the box. To personalize the settings of the High Contrast option, left-click the Settings button. You have the option of enabling a keyboard shortcut that will activate the high-contrast feature; to enable the shortcut, left-click the box by Use Shortcut to place a check in it. (This keyboard shortcut is particularly useful if you share your computer with someone who prefers the standard setting. If you're the only person using the computer, it's easier to leave the High Contrast feature on permanently.)

You also can choose your preferred color scheme. You can choose from White On Black, Black On White, or Custom. Place a dot in the circle in front of the option you prefer by left-clicking it. If you choose Custom, you can choose from several color schemes in a drop-down list. Left-click the arrow at the right of the box to see the list.

To choose a color scheme, left-click it. Then left-click the OK button at the bottom of the Settings For High Contrast window. Then left-click OK at the bottom of the Display window. Win95 will apply the color scheme to your display.

Unfortunately, there's no way to preview a color scheme before applying it to your display. If you decide that you don't care for the new color scheme, follow the steps outlined above to go back and change it to something easier for you to read.

Some of the color scheme options have the words "large" or "extra large" in parentheses after the name of the color scheme. Choosing one of these options will make the text and icons on your display appear larger than normal to increase their visibility.

Resolution

You also may improve your display by changing the resolution setting. To do this, go to the Control Panel and double left-click the Display icon. Left-click the Settings tab. Slide the pointer under Desktop Size to the right by left-clicking the pointer and dragging it. Left-click OK and restart your computer as prompted for the new setting to take effect. When your computer restarts, you will receive a message if the new display setting doesn't work with your monitor. If this is the case, return to the Display Settings window and change the resolution back to the original setting by moving the slider bar back to the left, or Less.

If you successfully raise your screen's resolution, you may need to increase the font size, which decreases at higher resolutions. (Note that changes made in font size here, designed to adjust for resolution changes, are not as dramatic as those accompanying some color schemes, which are designed for users with vision problems.) You can do this by left-clicking the drop-down list arrow under Font Size and choosing the size you want. The Font Size option is unavailable at some lower resolutions.

When the display settings are correctly set for you, you shouldn't have to lean in to your screen to read it or squint at the type to bring it into focus. The best distance between your eyes and your monitor, according to ergonomics experts, is between 14 and 30 inches. Your eyes should fall about three-fourths of the way up the monitor. Remember your mother's lectures and set your display options so that you can read the screen easily from that distance. ●

by Diana K. McLean

Taking Screen Captures In OS/2 Warp

"A picture is worth a thousand words."

The truth of this oft-repeated statement is reinforced in a number of writing situations, including computer-related writing. When it comes to explaining the contents of an entire screen or even a small dialog box, you can spend pages writing about the various details you see. Or you can show your reader exactly what you see, using a print screen or screen capture function.

IBM's OS/2 Warp operating system offers a built-in print screen function, or you can download a free program that delivers several screen capture capabilities.

Print Screen

Taking an image that appears on your screen and placing it directly onto a piece of paper requires the use of a single key. That key, appropriately labeled PRINT SCREEN, is above the cursor control keys on the right side of a standard keyboard.

To use OS/2 Warp's print screen function, you must first enable it. To do that, you need to: double left-click the OS/2 System icon, double left-click the System Setup icon, double left-click the System icon, left-click the Print Screen tab, left-click the Enable function, and close the window. After you enable the function, all you have to do is press the PRINT SCREEN key. The exact image that appears on your screen moves directly to your printer. If you want to choose a specific window to print instead of the whole screen, press the CTRL and ESC keys simultaneously. When the Window List appears, highlight the item you want to print, minimize the window, and hit the PRINT SCREEN key.

Screen Capture

To capture an image on your screen and save it into a file for later use, or to print to a PostScript high-quality printer, you will need a copy of the IBM screen capture software *PM Camera/2*. The program works with OS/2 versions 2.0 and newer, and you can find a free copy on the Internet or CompuServe. The Internet address is: ftp://service.boulder.ibm.com/ps/ews/pmcam2. To find the file in CompuServe, start with the Go service. Enter Go: **support**, pick Operating Systems from the directory, choose PC File Finder, select Access File Finder, select File Name, and type **pmcam.zip**. Once the search is complete, select Display Selected Titles, and PM Camera/2 should appear in the list. Once you have located the file, in either location, download the program, **unzip** it, and save it to a new directory on your hard drive. (Unzipping decompresses files with the .ZIP extension by using the *PKUNZIP* program.)

To use the software, double left-click the camera icon in the PM Camera/2 group of files. A window will appear with a number of choices. In the Grab column, you can choose whether you want to capture a full screen, partial screen, or active window. Then choose how you want to save the image. You can pick from OS/2 Clipboard, PSEG38PP, PostScript, or OS/2 BMP.

If you have a graphics program that can read your clipboard, you can save your screen capture with it. (However, it only holds one at a time.) If you plan to use the image with a text file in a word processing program, you can save it using the PSEG38PP selection. If you want to send your image to a printer using PostScript computer language, choose that option. The final choice is to use the OS/2 BMP format. When you capture a screen in this mode, you save the file as a bit map. A bit map is a common image format, but to view your screen capture, you'll still need some type of graphics editor.

PM Camera/2 will choose a default file location and file name for each of your images. You can alter these choices by changing the words in the Path and Name boxes located at the top of the window.

Once you've made all the choices listed above and inspected the rest of the PM Camera/2 window, you're ready to perform a screen capture. Minimize the PM Camera/2 window and go back to work. When you find an image you want, just press PRINT SCREEN. If you selected the partial screen capture, when you hit the PRINT SCREEN key, cross hairs will appear on your screen. Use your mouse to create a box around the screen area you want to capture, then hit PRINT SCREEN again, and you've got it.

Once you've mastered the basic screen capture, you may find yourself wanting to alter the images more to your liking. To do this, you must find yet another program. The program recommended to us by the folks at IBM was *Open Shutter* from One Up Corp. The program sells for about $50 and offers a number of graphics editing functions that could really help you change your image. ●

by Tom Mainelli

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Basic Training

Regardless of the operating system you choose, there are a few elementary functions you should understand. This monthly section is your one-stop guide to learning these crucial first steps in DOS, OS/2 Warp, Windows 3.1, and Windows 95. Use it to learn your operating system and see whether others offer a smarter way to work.

UTILITIES

Utilities are programs that perform specific system management tasks. Slightly less-powerful versions of many standalone utilities are included with operating systems. We'll list the utilities included with each operating system, along with brief descriptions of their tasks. (Utilities included in multiple operating systems are described at the first occurrence.)

NOTE: To avoid confusion, we asked the manufacturer of each operating system for a list of the utilities included with its operating system. Therefore, some parts of the operating system that you consider utilities may not be listed.

MS-DOS

To run utilities in MS-DOS 6.22, type the command (shown in parentheses after the utility) at the command prompt.

Anti-Virus (msav)—Detects **viruses**, which are programs designed to damage systems.

Defragmenter (defrag)—Optimizes hard drive use by defragmenting files. (See page 14 in this issue.)

DriveSpace (drvspace)—Performs disk compression/decompression. (**Disk compression** reduces the amount of disk space required to store a file.)

MemMaker (memmaker)—Utilizes RAM efficiently by rearranging files.

Microsoft Backup (msbackup)—Backs up files and directories.

ScanDisk (scandisk)—Identifies hard drive defects.

SMARTDrive (smartdrv)—Performs disk and CD-ROM **caching**, which stores frequently accessed data in a special memory location for faster access.

Undelete (undelete)—Restores deleted files.

OS/2 Warp Connect

Though IBM listed many OS/2 commands as utilities, we'll list those that are comparable to utilities listed for other operating systems. Run these utilities by typing the utility name at the prompt in the OS/2 Window, which is opened by left-clicking the OS/2 Window object (icon).

BACKUP—Saves one or more files from one disk to another.

CHKDSK—Scans a disk and checks it for errors.

DISKCACHE—Allocates the amount of storage of an additional hard disk buffer. (A **buffer** is memory in which data is temporarily stored while being transferred to another memory location or device.)

FDISK—Lets you partition the hard drives on your system. (**Partitioning** divides a hard drive into distinct sections that act like separate drives.)

FORMAT—Prepares a disk to accept OS/2 files.

RECOVER—Recovers files from a disk containing defective sectors. (A **sector** is the smallest storage unit on a disk.)

RESTORE—Restores one or more backup files from one disk to another.

UNDELETE—Recovers deleted or erased files.

UNPACK—Decompresses and copies compressed files.

Windows 3.1

Windows 3.1 uses DOS 6.22 utilities. They should be run from DOS, not the DOS prompt in Windows. Two exceptions, MSAV (Anti-Virus) and MS Backup, can be started by double-clicking their icons in the Applications program group.

Windows 95

In Windows 95, most utilities are accessed by choosing Accessories from the Start menu and then choosing System Tools. Those that aren't (Fdisk and Format) can be run using the Run command from the Start menu. These utilities are both in the directory C:\WIN95\COMMAND. To find them, use the Browse feature in the Run dialog box.

Disk Defragmenter

DriveSpace

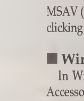
Fdisk—Creates or deletes partitions and **logical drives** (hard drive sections functioning as separate drives).

Format—Formats a disk.

Microsoft Backup

ScanDisk

CHANGING KEYBOARD SETTINGS



Most operating systems let users change the keyboard layout to type in foreign languages. Other settings determine how the keyboard reacts to keystrokes and settings for users with special needs.

MS-DOS

In DOS, your keyboard's language settings are changed by typing

```
keyb xx
```

at the C> prompt, replacing xx with the two-letter code for the language you want. Codes for the supported languages are found in your DOS manual.

■ OS/2 Warp Connect

While OS/2 has no way to alter the keyboard layout, it does let you change several keyboard settings. Double left-click the OS/2 System icon, then the System Setup icon, and then the Keyboard icon. To change the repeat rate (how quickly a character repeats when a key is held down), **delay until repeat** (amount of time before a character begins to repeat when a key is held down), or cursor blink rate, left-click the Timing tab and drag the slider bar for the setting you want to change. To change key combinations for displaying pop-up menus or editing **title text** (labels for objects or title bars), left-click the Mappings tab. The Special Needs tab lets you change keyboard response settings: **acceptance delay** (how long before a pressed key is accepted), delay until repeat, and repeat rate.

■ Windows 3.1

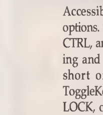
Windows 3.1's International icon in Control Panel lets you change your keyboard's layout to use many languages. After you click the icon, the window includes a Keyboard Layout drop-down list, from which you can choose a language. You also can change the delay until repeat and repeat rate.

■ Windows 95

In Win95, double left-click the Keyboard Properties icon in the Control Panel to access keyboard settings. To change the keyboard layout, left-click the Language tab. A list of installed keyboard languages is displayed. Left-click Add to add a language to the list. Select a language and left-click OK. You can set the Default language to any on your list of installed languages by selecting the language and left-clicking Set As Default. To establish a key combination to switch between languages, left-click the button next to the preferred combination.

You also can change keyboard settings through Control Panel's Accessibility Options icon. The Keyboard tab in the Accessibility Properties window lets you choose keyboard options. StickyKeys lets you use key combinations with SHIFT, CTRL, and ALT by pressing one key at a time instead of pressing and holding several. FilterKeys makes Windows ignore short or repeated keystrokes or slow the repeat rate. ToggleKeys sounds a tone when you press CAPS LOCK, NUM LOCK, or SCROLL LOCK. To choose an option, left-click the check box for that option. Each option can be personalized by left-clicking Settings in the box about the key option.

SIZING AND MOVING WINDOWS



In graphical interfaces, information is presented in windows, which you can move or size to suit your preferences. For example, in Windows 3.1, you may want your word processing document to almost fill your screen, leaving just enough room so you can see the icons of other open programs. Here's how operating systems let you manipulate windows. Note that this feature doesn't apply to DOS.

■ OS/2 Warp Connect

To move a window in OS/2, left-click its title bar and drag it to its new location. To **maximize** a window (make it fill the screen), left-click the button with a square in it at the upper-right corner of the window. To minimize a window, left-click the button next to that one, with the corners of a square. You also can move and size windows through the Window menu. (Left-click the button in the upper-left corner of the window and choose Window from the menu that appears.) In the menu, left-click the operation you want to perform. If you choose Move or Size, just move the mouse (without holding down a button); the outline of the window will change with your mouse movements. Left-click when you have the window sized or moved as you wish, and the window will adjust to the new perimeters. The menu also contains the options Restore, Minimize, Maximize, Hide, and Close. To perform one of these operations, just left-click it.

■ Windows 3.1

Windows 3.1 offers several ways to resize windows. You can use the arrow buttons in the upper-right corner of a window to maximize it (up arrow) or make it an icon (down arrow). When a window is maximized, instead of the up arrow, it has a button with both up and down arrows to return it to its original size.

If you move the pointer over the border of a window without holding down a button, it will turn into a double-arrow pointer as it reaches the border. When it does, press and hold the left mouse button and drag that edge to adjust the size of the window. Do this with as many sides as necessary to make the window the size you want.

The other way to size a window is to click the top button with the dash on it in the upper-left corner of the window. A menu appears; one of the choices is Size if the window is not maximized. When you click Size, the cursor changes to a four-way arrow. Move that to one edge of the window, click that edge, and drag it to adjust the size of the window. (This menu also contains Maximize [if the window isn't maximized already] and Minimize commands.)

To move a window, click the window's title bar and drag it.

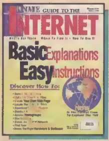
■ Windows 95

The buttons for sizing Win95 a window are in its upper-right corner. When the window is open, but not maximized, there are three buttons. The one with a flat line reduces the open window to a button on the Taskbar. The middle one, which looks like a window, maximizes the open window. (In maximized windows, the middle button looks like two stacked windows and reduces the open window to its original size.) The last button, with an X on it, closes the window.

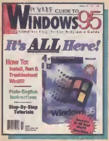
Moving a window in Win95, as in Windows 3.1, involves left-clicking and dragging. (The only difference is that with Win95, an outline of the window, not the window itself, moves until you release the mouse.) ●

by Diana K. McLean

Save time & money with these special issues from the publishers of PCNOVICE



Catch up with the hype and find out what the Internet is really about. This special issue will help experienced users get more out of the Internet while at the same time allowing new users to understand what the Internet is all about. Don't delay! The PC Novice Guide To The Internet is a must-have issue for anyone thinking about exploring the 'Net.



It's the biggest software launch ever, and *PC Novice* is here to guide you through the many changes. Don't fall behind! Get up to speed and become immediately productive with Windows 95. If you are thinking about making the change, this is the issue to read.

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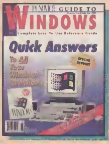

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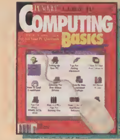
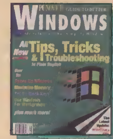
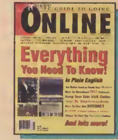


Written in the same plain-English style as *PC Novice*, the Guide To Computing Basics will help everyone with their PC questions. Whether you just bought a PC or you've been using a PC for years, this issue contains everything you need to know.



This Guide To Better Windows features hundreds of troubleshooting tips guaranteed to save you time and money. It will unlock the secrets of Windows, including a special section on Windows & Networking. If you enjoyed Windows Quick Answers, this is a must-have issue.



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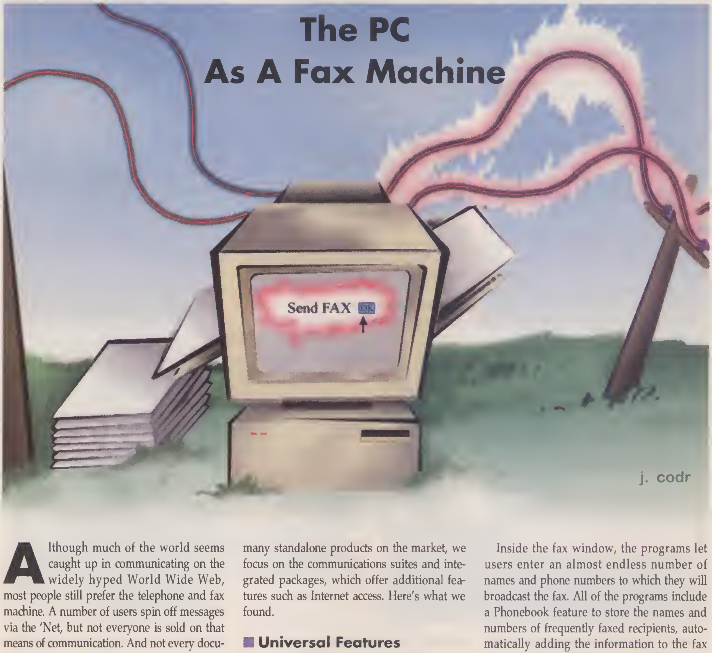
Get Your Fax Straight:

The PC As A Fax Machine



Although much of the world seems caught up in communicating on the widely hyped World Wide Web, most people still prefer the telephone and fax machine. A number of users spin off messages via the 'Net, but not everyone is sold on that means of communication. And not every document is best-suited for distribution through electronic mail (E-mail).

That's why most homes and small businesses still need fax capabilities. With a fax/modem and fax software, users can quickly send documents and images to fax machines or other computers equipped with fax/modems.

This month, we review software that lets you fax from your PC. Because there aren't many standalone products on the market, we focus on the communications suites and integrated packages, which offer additional features such as Internet access. Here's what we found.

Universal Features

Whether it's a standalone package or a suite, there are a number of universal features found in every fax program we reviewed. For example, users either can fax from the fax program, attaching the file they want to send as a fax, or they can fax straight from a word processor or other Windows application, selecting the fax software instead of the printer in the printer setup.

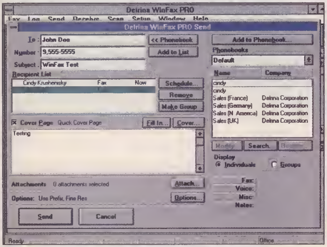
Inside the fax window, the programs let users enter an almost endless number of names and phone numbers to which they will broadcast the fax. All of the programs include a Phonebook feature to store the names and numbers of frequently faxed recipients, automatically adding the information to the fax window with the click of a button. Users also can choose to send a cover page from one of the bundled outlines or design their own. They then can indicate whether they want to send the fax right away or at a later day and time, maybe when the phone rates are cheaper.

To manage fax loads, all of the products include inboxes and outboxes and let users create special folders where they can store faxes.

All have automatic receive options that let the computer answer the fax call, as well as annotation features for marking up a faxed document, drawing lines and shapes, adding clip art, or laying text over the top. They all contain **optical character recognition** (**OCR**) that converts a faxed document into a text file that can be edited or changed. (Remember: Faxed documents [before being run through OCR] are black-and-white images of your documents, not the actual electronic files. You can't rearrange the wording or edit a faxed document sent through the computer; it's just as if you had sent the document from one fax machine to another.)

A Wealth Of Extras

Once past the universal fax features, we discovered some interesting things. Not only do most packages offer data communications to connect to bulletin board systems (BBSes) or to download files to your computer, many include Internet browser software to cruise the World Wide Web. They also can download file-transfer protocol (FTP) files or receive messages from special interest newsgroups. Some even include voice capabilities that let your computer store telephone messages in a bunch of mailboxes and offer links to your E-mail system so you can manage fax and E-mail in one place.



To: John Doe
Number: 9,555-5555
Subject: WinFax Test
Recipient List: Cindy Krushenisky Fax Now
☒ Cover Page Quick Cover Page
Testing
Attachments 0 attachments selected
Options: Use Prefix, Fine Res
Phonebooks: Default

Name	Company
cindy	
cindy	
Sales (France)	Delrina Corporation
Sales (Germany)	Delrina Corporation
Sales (N. America)	Delrina Corporation
Sales (UK)	Delrina Corporation

Display
● Individuals ○ Groups
Fax:
Voice:
Misc:
Notes:

The boxes and buttons in the *WinFax Pro* fax window are so self-explanatory, it's almost manual-proof.

Most communications packages work with Windows 95, an operating system that can manipulate 32 bits of information at a time. Win95 permits the packages to run a little faster and work in the background while you do other things. Delrina boldly made its newest communications suite available only for the Win95 platform, not for Windows 3.1, a 16-bit operating environment. Shelly Sofer, spokesperson for Delrina, says the 32-bit platform is more stable and reliable. Because Win95 offers multithreading, it doesn't hang up when you are sending a transmission and want to do something else at the same time. (While **multitasking** lets you run more than one program at a time, **multithreading** lets you do more than one thing in a program at a time.)

A Telephony Application Programming Interface (TAPI) in Win95 aids in PC/telephone interaction, allowing more than one communications package to access your modem, Sofer says. We found that the Win95 packages did operate a little faster, and they were definitely easier to install. Plug and play takes care of all the hard work for you.

While it's great to get everything you need in one place, the Swiss-Army-knife concept does have its drawbacks. Often the suites aren't as strong as standalone packages. For instance, we found that the Web browsers weren't as full-featured as the popular *Netscape Navigator*. Also, all of these features take up a lot of hard drive space, ranging from 12 megabytes (MB) to 50MB.

And The Winner Is . . .

So what was our pick? *WinFax Pro*, one of the biggest sellers in the fax marketplace. It's one of the most full-featured, easy-to-use packages available that you can purchase by itself or in Delrina's communications suite.

WinFax Pro/Delrina CommSuite. Now available as version 4.0 for Windows 3.1 and version 7.0 for Win95, WinFax Pro by Symantec's Delrina Group (800/441-7234 or 541/334-6054) includes in both versions virtually equivalent faxing features for about the same $75 price, but with a different interface. In Windows 3.1, you enter all of your information into one window, and you don't even have to consult the manual (a big plus in our book). In the Win95 version, a Fax Wizard walks you through the process. The Win95 version also utilizes a CommBar across the top of your Desktop that works like an automated attendant, checking for incoming faxes and indicating call status. We really liked the detailed information WinFax Pro displayed to keep us updated on the progress of our fax. We even

Faxing Files?

Along with all of the fax packages on the shelf this year, you'll find *3D FaxFile* 2.0 by InfoImaging Technologies (800/966-1140). It promises to take your fax/modem one step further. Don't be confused; this is not a standalone fax package. It sends files, not faxes, and requires a standalone fax package to do the actual sending.

Run a file through the 3D FaxFile program, and it comes out compressed into a special code called an Infoimage that is transported to your fax software. From here, you can send the Infoimage to another computer. You also can print the document and send it through a fax machine. You even can send it to a fax machine, but the fax must be scanned back into a computer with 3D FaxFile for decoding.

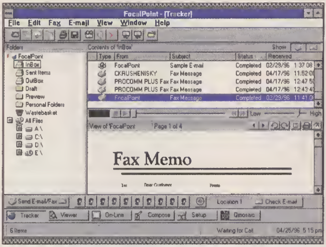
3D FaxFile sounds like a good idea. It has advantages over sending a file as an attachment to your E-mail. For instance, a 200-page document can be compressed to one page, limiting the cost of a long-distance fax. It also adds a security feature. When we sent the file to a fax machine to see what would happen, the file was saved in scrambled boxes of squiggly lines—not something anyone who accidentally received it could decipher.

While the 3D FaxFile received a lot of press prior to its release, it will take a while to tell whether this method of sending files will catch on. The 2.0 version was expected out this summer with a price of $99 for a standard version and $199 for a souped-up professional version. If you'd like to try it, a free demo is available at InfoImaging's home page at http://www.infoimaging.com. ○

could check the status at a glance, observing a fax machine icon that feeds a paper through itself.

Besides making it easy to send faxes, WinFax Pro made it a breeze to manage them. Users just highlight an entry to see its history—the recipient, fax number, number of pages, number of retries, connection date and time, call status, speed connect, and the duration of the fax call. A Messaging Application Programming Interface (MAPI) in Win95 lets users include their E-mail within WinFax so they can manage all their messages in one place.

There are plenty of cover sheets to choose from, or users can create their own with clip art. The annotation features in this product are probably the most extensive, including a neat option to place "stamps," such as a Confidential stamp or Draft label, on faxes. And there are handy cleanup features that remove nasty dots or lines that may appear on faxes you have received. When we put WinFax Pro through its paces, it sent our fax in the fastest time, but the OCR software had trouble recognizing the C's in our document, as we used an unusual font.



Type	From	Subject	Status	Received
	FocalPoint	Sample E-mail	Completed	02/29/96 1 37 08
	CKRUSHENISKY	Fax Message	Completed	04/17/96 11.52 0
	PROCOMM PLUS Fax	Fax Message	Completed	04/17/96 12 47 5
	PROCOMM PLUS Fax	Fax Message	Completed	04/17/96 12 43 40
	FocalPoint	Fax Message	Completed	02/29/96 11 41 0

With *FocalPoint*, there's little room to wonder if you received a message; all of your faxes, E-mail, and voice mail are stored in one inbox.

Of course, if you want to do more than just faxing, Delrina does offer a communications package called *Delrina CommSuite* that includes WinFax Pro and software for Internet access, newsgroups, E-mail, data communications, and telephone voice mail. At $129, the suite is available only for Win95 on CD-ROM and will take up a whopping 50MB of hard drive space. Delrina incorporates its WinComm application to connect to other computers and upload or download files, storing the locations as icons in a Phonebook. In addition, WinComm includes an antivirus program for downloaded files, an Image Manager for viewing graphics files, and a Zip Manger for compressing files.

CyberJack, the Web browser, is easy to use and includes a nifty Cyberjack Guidebook that features Internet icon Web links to popular sites. If you have a modem with voice capabilities, TalkWorks lets your computer act as a sophisticated answering machine. When callers get your machine, they can "press one" to leave a message for marketing or for mom, then "press two" to leave a message for administration or for dad. And thanks to TalkWorks, users can call in and order faxes-on-demand that are faxed to their machine, or you can use the PC as a speakerphone. Finally, if you are away from your computer, you can forward faxes and messages to another number or have the program page you.

Procomm Plus. *Procomm Plus 3.0 for Windows* by Datastorm (800/474-1541 or 573/443-3282) also makes it easy to fax with no manual required. Users can send a fax to several recipients and can schedule a fax to be sent later. We were a little disappointed, however, by the lack of information the program gave us on the progress of faxes. Microsoft Fax, the program built into Win95, actually gave us more connection information when we faxed to a computer equipped with it.

One handy feature is the ability to view a thumbnail of a fax in the corner of the window by highlighting its entry. This option makes it easier to remember what the fax looked like without having to enter a viewer and look at the whole page. There are many predesigned cover pages to choose from with this program, or you can create your own. All the bothersome lines and garbled text on faxes can be taken out with a click of a button, and a number of annotation features lets users add lines, shapes, text, and clip art to the faxes. When we tested Procomm, it sent faxes in about average time. The OCR recognition worked perfectly and let us spell check our documents.

As for the rest of the program, Procomm Plus includes data communications to send and receive files by connecting directly to other computers or a BBS. Users also can connect to the Internet through its Web Zeppelin application and access E-mail, newsgroups, and FTP servers. We had a few problems

Have Win95, Will Fax

If you're using Windows 95, you already may have a fax program. To discover whether you do, double left-click the Inbox icon on the Desktop to get to Microsoft Exchange and check the Compose menu for the New Fax option. If it's not there, you'll have to dig out those Win95 installation diskettes and go through the Add/Remove Programs application in Control Panel to install Microsoft Fax.

In Microsoft Exchange, your Microsoft Fax messages will be stored along with any E-mail messages in inboxes, outboxes, or special folders you create. To open the Fax Wizard, simply select the Compose menu and New Fax. In the first window, you set your specifics: dialing prefixes, area code, and so forth. Next, type a name and number, then add that information to the list. You then can enter additional recipients. In the next window, choose from four basic cover pages and select whether you want to schedule the fax to be sent at another time. In the following windows, you'll fill in the cover sheet and attach any documents you want to fax by their file name. When you're done, left-click the Finish button. A Fax Status windows pops up, indicating the calling progress.

Microsoft Fax also can receive faxed messages. When a call comes in, left-click the fax machine icon in the Win95 Taskbar. In the Fax Status window, left-click Answer Now, and Microsoft Fax places the fax in your inbox. ○

connecting to our Internet service provider because it wasn't on the list of recognized providers. We had to help the program in setting up an instructional script to connect, which took a little extra work. Also, the program doesn't include voice mail features, as many of the other programs do. Procomm Plus is available on CD-ROM for Windows 3.1 and Win95 for about $135.

BitWare Plus. While *BitWare Plus 4.0 for Windows* by Cheyenne Software (800/603-0073 or 516/465-4000) has no browser to connect you to the Internet, it does have features that answer the phone, make speakerphone calls, take voice messages in numerous mailboxes, send and receive faxes, take calls for faxes-on-demand, connect to BBSes, perform data communications, and send messages to Sky Tel pagers. Of course, to use all the options, you will need a voice/fax/modem; otherwise, the program may not be worth the money.

The fax portion of the program is one of BitWare's biggest strengths. It sent the fax almost as quickly as WinFax, and the OCR software worked well, except that it forgot to recognize the periods at the ends of our sentences. The program has good annotation features, but they're not quite as extensive as WinFax's. You can enhance faxed images with an Anti-aliasing feature to give graphics and text a smoother look, although we didn't find a way to specifically remove garbled lines or dots on the fax. The program always let us know all the specifications we wanted, both about a faxed document and during the faxing process. But BitWare's interface is not as easy to use as WinFax's, making users hunt a little to find what they want. BitWare Plus for Windows is available on diskette for about $129.

FocalPoint. If your modem can do voice, fax, and data communications, we strongly suggest that you look closely at *FocalPoint* by Global Village Communications (800/329-9675 or 408/523-1000). While it didn't necessarily wow us on the fax side, it had a lot to offer as a complete messaging product. In one mailbox, you can manage all your faxes, voice messages, and E-mail, including messages from an Internet account or online service such as America Online or CompuServe. This is very handy.

It has all the standard features for a fax product: multiple fax broadcasting, schedule times, personalized cover page design, and so forth. When we put the program to work, it sent faxes in average time, and the OCR performed perfectly. A wizard walks users through the fax process, but the rest of the fax program was very limited. There are a few annotation features, but we couldn't find a feature that would take lines or garbled messages out of received faxes. And because it includes voice options, you can do fax-on-demand and play hold music.

FocalPoint does include Internet access, actually bundling Quarterdeck's *Mosaic World Wide Web Browser*. It's a good, easy-to-use browser with no frills that gets the job done. Enter your account information and password, and the program will retrieve your Internet or online service E-mail into the centralized mailbox. FocalPoint also can be set up to retrieve messages when you are away or to page you. For about $99, FocalPoint is available on CD-ROM and diskette for Windows 3.1 and Win95.

01/Faxcom. The only other standalone package for Windows 3.1 that we reviewed (other than WinFax Pro) was *01/Faxcom* by 01 Communique Laboratory (800/668-2185 or 905/795-2888). For a price of $109, this is an extremely simple data/fax program that will let you send and receive faxes or enter a terminal mode for data communications.

While it seems as if faxing will be easy (all your options appear as big buttons in a window), the window in which you enter your fax information is a little busy and confusing. The graphics viewer doesn't include many file types, and there are very few predesigned cover sheets. The OCR works perfectly, but 01/Faxcom was a little slow when it came to sending faxes. A suite package called Communicate! will include 01/Faxcom, as well as Internet E-mail, data communications, and voice mail capabilities. It was expected to be released for Windows 3.1 and Win95 this summer for a suggested retail price of $179.

All of the fax packages reviewed had the same basic features to put your fax/modem to work. If you're looking for a package based entirely upon faxing capabilities, go for WinFax Pro. But with all the options available today, consider one of the communications suites or integrated products. For a little more money, you'll be set for options you'll use today, as well as with those you might need down the road. ●

by Cindy Krushenisky

Faxing With WinFax Pro

Faxing within Windows 3.1 may not be as speedy as in Win95. But using our pick, *WinFax Pro* 4.0, faxing can be just as easy.

Fax from within WinFax Pro by clicking the Send button. Or, to fax from popular Windows applications, choose to print, but instead of using your regular printer, go to Print Setup and select WINFAX on FAX-MODEM.

In the fax window that opens, enter the recipient's name in the To: box, fax number in the Number: box, and topic in the Subject: box. If you need to dial 9 or use another dialing prefix, click the Options button to place a check mark beside the Use Prefix option, then type the number in the appropriate box.

After you've filled in the To: and Number: boxes, add recipients to your Phonebook by clicking the Phonebook button and the Add To Phonebook button. The next time you fax that person, click the Phonebook button to select the listing.

Next, click the Add To List button. You now can type in another recipient. If you fax the same documents to several people, select their names in the Recipients list and group them together in your Phonebook with the Group button. If you also want to send the messages at another time and day, click the Schedule button.

To send a cover page, click the box next to Cover Page so an *X* appears, then click the Cover button. In the new window, select a cover file and click OK. Back at the Send window, click the Fill In button to enter a message in the body of the cover page, then click the Send Fax button. The Attach button or Make Attachment button lets you fax another document or choose the file name of a document, if you haven't already.

Once you're satisfied with the fax setup, click the Send button. WinFax dials the number, indicating on-screen the exact progress of the call.

Want to receive a fax? If you want WinFax to answer the call, click the Automatic Receive option in the Receive menu. Or, select Manual Receive Now from the Receive menu to answer a fax call yourself. ○

Colors By Fuji

(Of course.)

Hey, who turned on the color in the computer products aisle? Fuji. Who else? Their 3.5" 2HD Formatted Rainbow Packs are a brighter, more efficient way to organize your data. And they're a lot more fun, too, of course.

Computer Products

Overboard With Options

PCs Packaged To Win Your Dollar

Gone are the days when computer consumers were only the technologically advanced who shopped with benchmark test numbers in hand. About two-thirds of American homes still lack PCs, and shoppers purchasing for some of those homes may buy with a different mind frame. Sure, average consumers know approximately what kind of processor they want, but they are less concerned with the technical details. Additional options, such as bundled software or a funky color, may tip the PC purchasing scales in favor of a particular model.

That's what computer manufacturers are banking on, anyway. PCs for '96 are accessorized to catch your eye and, hopefully, your pocketbook.

Multimedia Madness

Last year, multimedia was the craze, and consumers had to decide whether to spend a little extra for a double-speed CD-ROM (compact disc, read-only memory) drive, sound card, and speakers. But today, it's difficult to find a consumer PC that isn't equipped for multimedia. Instead, manufacturers are emphasizing extra video and sound capabilities that improve performance.

The majority of Pentium systems available include **MPEG** playback. MPEG (Motion Picture Experts Group) is a standard format for compressing video and audio into a digital format. Most systems do this through software, and you'll likely see MPEG playback indicated somewhere within the feature listings. Compaq, however, includes MPEG that's built into the hardware on some of its systems. The benefit of hardware MPEG is that the microprocessor doesn't have to spend precious power processing the MPEG software instructions as it processes the rest of the software instructions, making the computer run more efficiently.

Some higher-end Pentium systems also include **wavetable** sound. Wavetable is a step up from ordinary 16-bit sound and produces digital music files in a realistic way. While regular 16-bit sound files are reproduced through FM synthesis and can sound a little tinny, wavetable synthesis creates music that sounds like actual instruments. We found mid- to high-end systems with wavetable from Compaq, NEC, Gateway 2000, and Hewlett-Packard.

Almost every PC producer is bundling six-speed (6X) CD-ROM drives, which can transfer 900 kilobytes per second (KBps) of information to the PCs. While 4X drives, with 600KBps transfer rates, still seem to be the standard, they may not be for long. The 6X drives are available in the majority of popular computer lines, and you even can find a few 8X drives, with 1.2 megabytes per second (MBps) transfer rates, from Acer.

Another option for users who want to listen to audio CDs or for those who often alternate between CD-ROM programs are CD-ROM changer drives. IBM offers a four-disc CD-ROM changer in a few of its Aptivas while AST offers a three-disc changer, both of which act similar to the CD changers you find in stereo systems.

Computer/Telephone

Multimedia, microphones, and 28.8 bits per second (bps) modems seem to be the norm in most Pentium systems. They also seem to be the perfect makings of a PC answering machine. If the telephone rings and you don't pick up, computers with the proper setup will answer for you. Use a standard message or record your own, then play back messages that you can save or trash. Compaq has an unique feature in its answering machine system, called SpeechMail, that lets the user call in and manage their messages through voice commands over the phone. IBM's Aptivas will even Wake Up On Ring when a call comes in, powering on only when needed.

In addition to answering calls, most PCs can make them. Use a dialing software interface to type in the phone number, then talk through the microphone and listen via the sound card and speakers. While some computers act as half-duplex speakerphones, allowing only one person to talk at a time, others may include full-duplex speakerphone capabilities so that talking through the computer is no different than talking on the phone.

A few systems are equipped with specialized modems that let you talk and work at the same time. Packard Bell and AST offer VoiceView modems so users can transfer files or data, and simultaneously, talk to people at the other end. This is handy, for instance, if you want to taunt your opponents as you play them in online games or shop electronically while you talk to a salesperson. Packard Bell uses the VoiceView modems to aid in technical support. A technician can "log on" to your computer through a modem and talk you through the problem while connected.

Storage Savvy

If more than one gigabyte of hard drive space isn't enough for you, now you can shop around for other bundled storage alternatives.

Take, for example, Hewlett-Packard's offering. The company includes the popular Iomega Zip drives in its Pavilion line. Information is stored magnetically on 100MB cartridges that you can remove and store. The cartridges are handy for large graphics files or backing up your computer system and can be found in stores for about $20 each.

Another option is the Panasonic PD-CD drives that come pre-installed in Compaq Presario units. You can use the 4X CD-ROM portion of the drive just like any other CD-ROM drive. The other portion uses Phase Change Dual technology, an optical method, to store about 650MB of information on a disc/cartridge. This is probably an even better alternative for making computer backups, costing about $30 for additional PD cartridges.

For users who prefer diskettes, Compaq is bundling LS-120 high-density diskette drives in its ProLinea and DeskPro systems. This technology, which Compaq helped develop with 3M, Matsushita-Kotobuki Electronics, and O.R. Technology, can store 120MB of information on special diskettes through a combination of magnetic and optical means. The diskettes, which are the same size as ordinary 3.5-inch diskettes, cost around $20 each. The drives are also backward-compatible with 1.44MB, 3.5-inch diskettes, meaning you can store information on and retrieve it from the old diskettes. Eventually, the LS-120 drives also may be available on Compaq's consumer Presario lines.

Gizmos And Gadgets

Don't rule out the true computer gadget. Lots of systems have gimmicks that may win you over. Some let you compute from across the room, some let you create digital photo albums, and some let you turn your computer into a home entertainment system.

Where To Go For What You Want

Looking for an extra?
These companies offer unique options in select systems.

Acer Aspire (800) 239-2237 (408) 432-6200	Charcoal/Black or Emerald/Purple PCs 8X CD-ROM drives Voice recognition software
AST Advantage (800) 876-4278 (714) 727-4141	3-disc CD-ROM changers VoiceView modems
Compaq Presario (800) 345-1518	Scanner/keyboards LS-120 diskette drives (in ProLinea and DeskPro systems) PD-CD drives SpeechMail voice recognition
Gateway 2000 Destination (800) 846-2000 (605) 232-2000	31-inch monitors TV cards
Hewlett-Packard Pavilion (800) 752-0900 (415) 857-1501	Built-in scanners Iomega Zip drives
IBM Aptiva (800) 426-3333 (914) 765-1900	4-disc CD-ROM changers Wake Up On Ring Voice recognition software
NEC Ready (800) 615-5566 (508) 264-8000	Remote controls Voice recognition software
Packard Bell Platinum (800) 733-5858 (818) 865-1555	VoiceView modems Remote controls Optional TV card Optional FM radio receiver card

For example, want to read your mail, answer the phone, or close a program from across the room? Let your fingers do the walking with a remote control. NEC Ready systems and the Packard Bell Platinum and Platinum Pro series include remote controls that let you manipulate the telephony features, CD player, and the cursor (on the Packard Bell units).

If you'd rather tell your PC what to do, a few computers include voice navigation software. For instance, Acer, IBM, and NEC include software that programs the computer to respond to your voice. Talk through the microphone, telling the PC to open your word processor or save a file, and the system will do it. But, the computer may not respond on the first try, or it may not recognize your voice at all. Voice recognition still needs a little work to make it 100% effective.

Gateway 2000 introduced a much-hyped innovation this year that has a price tag matching the size of its screen. The mail-order company is offering 31-inch VGA monitors with its Destination systems, which start at about $3,500. Along with the big screen, you get a remote control and wireless keyboard. The company also includes a video/television card and beefed-up wavetable sound features, so the computer can work as a total entertainment system.

But Gateway 2000 isn't the only company offering built-in television cards. Apple Computer includes a video input\output source in some units, which takes video from a television or VCR, and an optional television tuner card to let some systems receive television signals. Packard Bell offered units with television cards, as well as FM radio receiver cards in some units in its older Spectria line, and has such features as an optional add-on for the Platinum and Platinum Pro lines.

Built-in scanners are another idea that lets users feed pictures into their PCs. Compaq includes a scanner built right into the keyboard. Hewlett-Packard also includes a slot within the computer unit, just under the drives, that will scan a photo up to 5 x 7 inches.

If all of the extras don't hook you, how about a sleek-looking design? Packard Bell produces a handful of triangular units with wavy gray and beige designs that fit into a desk corner. Acer dumped the beige, boxy design with its Aspire systems, offering color combinations of emerald green/purple or charcoal gray/black. The angles are smoothed, and the sides are covered with holes. In fact, most computer companies have rounded the corners of their systems, eliminating the boxy feel.

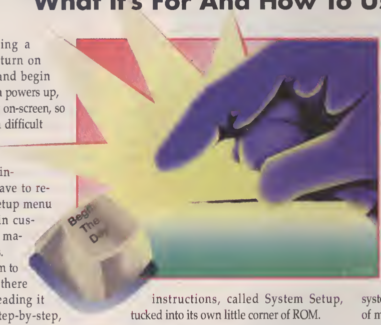
Shop Smart

While extras add value to a computer, we don't necessarily recommend buying a PC because of unique options or a software package. However, if you're trying to decide between two PCs that have the same standard features and cost the same, take the one with the extras. The bottom line is to shop smart, compare prices, and buy the system that meets your needs. ●

by Cindy Krushenisky

System Setup:

What It's For And How To Use It



Simply by pressing a button, we can turn on our computers and begin the day. When the system powers up, a lot of text lines flash by on-screen, so quickly that they're often difficult to read. What goes on before your system invites you to interact with it doesn't have to remain a mystery. The Setup menu will give you a hand in customizing the way your machine sets up its functions.

In order for your system to boot up and function, there must be information leading it through the process, step-by-step, every time. It needs to be told what components are installed on your system before it can run through its wake-up practices. The system will go through these steps on its own as it boots, but if you want to make alterations to your system's functions that you can't change within the operating environment, you might be able to make the changes from within the Setup menu.

The instructions for the computer's awakening are stored in **ROM** (read-only memory, a form of memory that can't be written to or changed) as the **BIOS** (Basic Input/Output System, a detailed set of instructions that mediates hardware communications). The data that the setup uses, information on the drives you have, etc., are stored in a small segment of ROM that is kept alive at all times by **CMOS**. (CMOS [Complementary Metal-Oxide Semiconductor] consists of two field transistors on a silicon chip that are high-speed, low-power-consuming devices that are generally used for RAM and switching applications.)

Because of the CMOS chip's small power requirements, the computer's battery maintains the information on this chip while the rest of the system is powered down. To provide the system with the information it needs to function, manufacturers include a menu of instructions, called System Setup, tucked into its own little corner of ROM.

System Setup, sometimes called System BIOS or ROM BIOS, is actually only one part of BIOS. This "system's" purpose is to help prime your computer for its functions by loading basic instructions into the PC's short-term memory. In addition, BIOS runs a preliminary check called the **Power On Self Test**, or **POST**, to make sure all components are functioning normally, then BIOS loads the configuration information, such as type of monitor, sound of a key depression, system password, distribution of memory, etc. The BIOS instructions are etched into a chip so they can't be erased, although they may be modified by the user. A seemingly fatal error committed while fiddling with the treacherous setup can be corrected by reactivating the instructions physically embedded in the chip.

You may have to make adjustments in setup when performing upgrades or adding hardware to your system. This doesn't involve pointing devices but does include hard drives, diskettes drives, and video upgrades. Operating environments, such as Windows 3.1, may provide software with drivers, but you'll still need to make the adjustments within the system setup. Your manual should provide the correct parameters. If not, call the manufacturer and ask for them.

The BIOS performs the same basic function for every system, but each system has its own idiosyncrasies. The BIOSes of most PCs are written by five major manufacturers, so they can be divided into five types: AMI, Award, DTI, IBM PS/2, and Phoenix. Each system has its own method for entering the BIOS System Setup. In general, the copyright message your system displays as it boots will tell you which one you have, or you can peek in at the label on the BIOS chip located on the motherboard. To enter each system, follow the chart at the bottom of this page.

Another common method of entering BIOS is to watch for a line that reads Setup= during the POST information and then depress the key listed.

The Options

The standard options in the System Setup menu include: hard drive, diskette, memory

BIOS Maker	Entry Keys	When You Can Enter It
AMI	DEL	During POST
Award	CTRL-ALT-ESC	Anytime
DTK	ESC	During POST
IBM PS/2	CTRL-ALT-INS	After pressing CTRL-ALT-DEL
Phoenix	CTRL-ALT-ESC or CTRL-ALT-S	Anytime

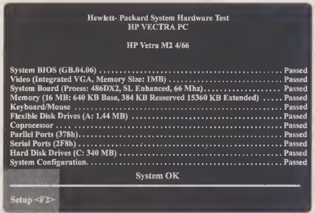
type, date/time, and, possibly, monitor type. At one time, the monitor information was standard BIOS information, but modern systems tend not to include it. Other than these few selections, changeable options vary widely from system to system. Although System Setup is not the scary netherworld it's often portrayed as, playing with system configurations without a firm grasp of what you're manipulating could render your machine inoperable.

The choices under the Setup menu may vary depending upon the various setup configurations. The system we used is a Hewlett-Packard Vectra 486/66. Our setup began with general computer information and user preferences. The first segment in our setup was the computer clock's date and time. You can change the date and time from within System Setup, but most operating environments provide a means to change the clock and time without going through this process. (See the sidebar "Sans System Setup" for additional information.) The rest of the options vary from system to system. Some of the things you might be able to change through System Setup are outlined here. The subcategories may differ, but this is a general description to give you an idea of what to look for.

User preferences. The User Preferences subcategory controls some of the miscellaneous user settings pertaining to your general system environment, focusing primarily on the keyboard. You can choose a user password, choose to have the screen blanked, choose to lock the keyboard, decide whether you want the NUM LOCK key on when you power up your PC, and control the key-click volume and the autorepeat speed. By setting a user password, unauthorized users are not allowed to power up your system or to access the system when the keyboard lock option has been selected and activated.

The Screen Blanking option blanks the screen when the keyboard is locked. The Keyboard Lock Timer works much like a screen saver. After a specified period of time, the keyboard locks up until the password is entered. The key-click volume is exactly as advertised; it controls key-click volume. Although one of the computer keyboard's benefits seems to be its ability to keep quiet, the silent keys unnerve some people. There was a demand that an artificial key-click be added to simulate the familiar sound of the typewriters many learned to twiddle their fingers on.

The last options control the speed and delay of the Autorepeat feature—how long a key needs to be depressed before the Autorepeat feature kicks in and the number of repeats per second. The power-on NumLock State controls whether the key is in the lock position when your computer powers up.

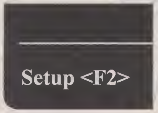


```
                 Hewlett- Packard System Hardware Test
                            HP VECTRA PC

                          HP Vetra M2 4/66

System BIOS (GB.04.06) ............................................. Passed
Video (Integrated VGA, Memory Size: 1MB) ........................... Passed
System Board (Proess: 486DX2, SL Enhanced, 66 Mhz).................. Passed
Memory (16 MB: 640 KB Base, 384 KB Resserved 15360 KB Extended) ..... Passed
Keyboard/Mouse ..................................................... Passed
Flexible Disk Drives (A: 1.44 MB) .................................. Passed
Coprocessor ........................................................ Passed
Parllel Ports (378h)................................................ Passed
Serial Ports (2F8h) ................................................ Passed
Hard Disk Drives (C: 340 MB) ....................................... Passed
System Configuration................................................ Passed
                              System OK

Setup <F2>
```



Watch for the Setup line at the end of the POST screen, then press the key specified.

Computer information. Next is the Computer Information category. The first subgroup is Power Management, which contains the Standby option that makes the screen go blank after a specified amount of time. The Sleep At feature just below Standby lets you select a time to put your computer down for the night. At the time you want your system to go into its version of dream land, the screen goes off, and the processor and hard drive stop running. This low-power mode lets you conserve energy without having to power down completely. This feature is especially convenient if you habitually wander away from the computer and forget to come back to shut it down. The computer is awakened by the touch of a predetermined key.

Security features. The subcategory Security Features is more concerned with the functions of drives, both hard drive and diskette, than what we would normally consider security features. For the Hewlett-Packard system we looked at, the first selection, System Administrator Password, sets a password that must be entered before making any changes to the system's Setup menu. Hewlett-Packard also gives the option of starting the system with the keyboard locked. The keyboard will respond to typed commands only after the password is entered.

The remainder of selections under the Security Features section pertains to the system's drives. You can determine which drive the system will first search for information, either the hard drive or a diskette drive. This is also where you enable or disable either drive. You may not be able to disable these drives unless they are connected to the system board through an "integrated" interface.

From System Setup, you also can decide whether to write to diskettes. If you use special program, or other, diskettes on which you want to protect the information, you can prevent the system from writing to the diskette. The more practical way of protecting your diskettes is to leave the write-protection notch in the upper-right corner open. (You should hold diskette label-side up with the metal slide at bottom.) Going through System Setup is a way to make absolutely sure you aren't going to overwrite important information, but this process seems a little arduous compared to other alternatives.

Video settings. The next group of settings is for video. The monitor might have many options: ESVGA, SVGA, VGA, EGA, etc. The setting should match the monitor type and accompanying expansion card. If you're installing a new monitor and video card to your system, make sure that the monitor and video card are compatible. For example, make sure you have an SVGA monitor and expansion card. Then make sure you have a compatible driver installed. If all of these check out, look in your System Setup configuration.

The video section of the Hewlett-Packard has a Refresh Rate option. A low refresh rate (the number of times the screen image is drawn per second) conserves energy, but some programs require high refresh rates to avoid a flickering screen.

Look But Don't Touch

There are a few options that look inviting, but the rewards for adjustment may not be worth the penalties of a misstroke. Clock timing is one selection that makes a tempting offer. Most people think they can shave seconds off their processing time by altering the clock speed. That may be true, but as trimming processing time, you're also shaving off your system's integrity. You have a margin of error to play with when manipulating clock speed, but if you exceed that margin, your system will crash.

Your setup might let you change the wait-states for memory. Lowering the number will speed up the system a little, but, again, if you set that number too low, you'll receive memory errors, or the system just won't run. In fact, the memory section is another one to give a wide berth.

If your system has crashed because of clock timing, memory, or hard drive problems, the difficult part is getting into System Setup to correct your tinkering when the system won't even run through the BIOS routines. There are two ways to reset the BIOS back to its original configuration using hardware. Some systems provide a jumper inside the system that will let you set the system back to the manufacturer's configuration. Other systems require you to unplug the battery and leave it unplugged for five or 10 minutes until the memory has drained. When you reconnect the battery and reboot your system, you should be back to factory parameters.

As a precaution, go into your System Setup menu and copy down all of the factory parameters *before* making any changes. In fact, make a hard copy (on paper) of your BIOS configuration when you first get your system. Keep this hard copy updated. Then, if anything goes wrong, you can quickly input the necessary parameters, whether they're the original factory configuration or your personal adjustments.

You'll also need this information if your motherboard's battery goes down. Once battery power is restored, the system can "find" the processor, you can fill in the date and time, and you can make a pretty safe guess that your diskette drive is a 1.44MB 3.5-inch drive, but after that, things can get tricky. The hard drive could have virtually any configuration (brand, size, format, etc.). If you don't know what your hard drive is, you should set the hard drive parameters low so you can get the system up to run a diagnostic. You may be able to access the information on the hard drive, but DO NOT write to the hard drive until you've got the system parameters all cleared up again. The best thing to do in this situation is to call the company you purchased the system from and get the specific parameters from those people.

Once your computer knowledge increases, you'll become more comfortable with the Setup beast. The System Setup feature is not one you'll use very often, but there are some manipulations that can't be managed any other way. ●

by Elizabeth Panska

Special thanks to author Winn L. Rosch for his help with this article.

Sans System Setup

Some of the System Setup options may look deceptively like an option present in an operating system. However, with one exception, none of the information offered in the System Setup menu can be modified from any other menu. Operating environments, particularly Windows, don't rely on the ROM or BIOS. Instead, they replace the BIOS routines with drivers. When you make system changes from within Windows, you change the parameters of the operating environment, not the system itself. If you exit out of the operating environment, the parameters will revert back to the original BIOS parameters. The one exception, as mentioned in the accompanying article, is the date and time. The operating system clock does go through the BIOS setup procedure, so the clock can be manipulated from within the System Setup menu or from within any of the four operating environments.

Here's how:

★ DOS

1. To change the time, type **time** at the C> prompt. Type in the correct time at the prompt provided.
2. To change the date, type **date** at the C> prompt and, again, make the changes at the prompt.

Remember to mimic the format given. Include dashes, colons, etc.

★ OS/2

1. Double left-click the OS/2 System box.
2. Double left-click the System Setup box.
3. Select Date/Time from within. A large clock will appear.
4. Left-click the small clock in the upper-left corner of the box.
5. Select Settings from the pull-down menu.
6. To make adjustments to date or time, place the cursor by the number you need to change and type in the correct number or use the up-down arrows to change the numbers.

★ Windows 3.x

1. Double-click the Main icon in the Program Manager.
2. Select the Control Panel option and look for the Date/Time option.
3. Open Date/Time.
4. Tab through the boxes to highlight the hour, minutes, seconds, month, and day. To change a highlighted number, either type in a replacement number or click the small up and down arrow to the right of each set of boxes (date and time).

★ Windows 95

1. Go into the Control Panel, which can be accessed in two ways. Either double left-click the My Computer icon and select the Control Panel or highlight the Settings option within the Start menu and then select Control Panel.
2. Double left-click the Date/Time Properties option. Win95 displays a calendar and a clock.
3. Change the month by selecting one from the pull-down menu to the right of the displayed month.
4. To set the day, highlight the date within the displayed calendar.
5. Change the year by left-clicking the up and down arrow to the right of the year box.
6. To change the time, highlight the numbers and change them by typing in the highlighted set of numbers or make the change using the up and down arrow to the right of the time box.

If you have the time displayed on your screen, you can access the Date/Time Properties more quickly by double left-clicking the display. ○

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COM Ports:

How To Tell Which Is Being Used

Serial ports, also called communications ports or COM ports, are used to connect hardware devices such as modems and serial printers to your computer. Some mice and other types of input devices use COM ports, though most newer computers have special, round PS/2 ports for mice and some of the other input devices.

You will have either two COM ports (COM1 and COM2) or, if you're using DOS 3.3 or newer, four. If you have do have four, COM ports 1 and 2 are usually the physical ports located on the back of your computer, where you plug in such devices as mice and external modems, while ports 3 and 4 are "virtual" ports, which can be used by internal devices such as internal modems. The exception is that you can add I/O (input/output) cards containing additional physical ports to your computer, making the upper ports, COM3 and COM4, accessible to external devices.

If you're a thorough record keeper, you may have a list of the devices using COM ports and which port each of the devices was connected to when you installed it. Unfortunately, most of us don't think we'll need that information, so we either never write it down or lose it. Then, if it becomes important for us to know which device is using which port (for example, to avoid a conflict between devices), we're left trying to make the computer tell us.

Looking It Up

Windows 95. Win95 makes it easy to find out which device is attached to which COM port, once you know where to look. Enter the Control Panel, double left-click the System icon, then left-click the Device Manager tab. To find out which COM port a specific device is using, you can select that device (such as your modem) from the tree by left-clicking the plus sign in front of it to expand the listing. For example, we selected Modem and got a listing for the Cardinal 14.4 Data Fax/Modem we have installed. To see details about the modem, we then double left-clicked that listing. That opened a window with the properties of the device. Left-click the Modem tab within this window to see information that includes the port used by the modem. (See Figure 1.) We found that the modem is connected to COM1.

Another way to find out which port a modem is connected to is to double left-click the Modems icon in the Control Panel, select the modem you want information about if there's more than one installed on your computer, then left-click the Properties button. That will display the same window we reached through the Device Manager, listing modem properties including the port.

Windows for Workgroups 3.11. Unfortunately, Windows versions before Win95 don't have such an easy method for determining which port a device is using. Windows for Workgroups 3.11 (WFW) does have a way to find out which ports are in use by which devices, but it's awkward and wasn't really intended to serve that purpose. In the Control Panel, choose the Fax icon, then click the Add button in the dialog box that appears. You'll see a list that includes Fax Modem On COM1, Fax Modem On COM2, etc. (See Figure 2.) If you highlight each of these in turn, clicking OK after each one, WFW will search for the device at that location and tell you what it finds. If the port isn't being used at all, you'll get a message saying no modem was found at that port. If another device is using that port, you should get a message telling you what device is using it. (When WFW asks if you want to add a modem in spite of what it has found, click No.)

Windows 3.1. Windows 3.1 doesn't offer even an awkward method for checking which ports devices are using because the Fax option isn't included in the Control Panel. We spoke with technical support personnel at Microsoft who told us that neither Windows 3.1 nor MS-DOS offers a way to identify which device uses which COM port. They suggested that users try third-party utility software, but they didn't know which ones would give the right information.

After a little digging, we found that *WinProbe* from Quarterdeck will identify which device is using each COM port. To get this information, users simply need to go into the program's Communications menu. WinProbe, which sells for a street price of about $49.95, checks all of the COM ports and reports what type of device is found at each port, as well as the IRQ address and any problems with the device.

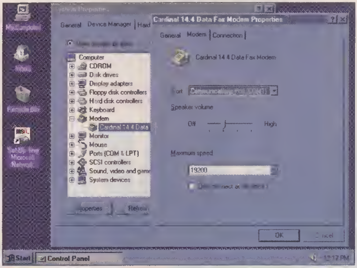


Figure 1: The Device Manager in Windows 95's Control Panel will tell you which port a device uses.

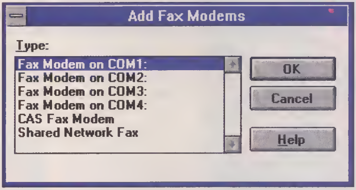


Figure 2: You can trick Windows for Workgroups 3.11 into telling you what's on which COM port by using the Add Fax Modem dialog box in the Control Panel.

There is one other possibility: If you have your owner's manuals for the devices installed on your system (and we hope you do because they contain important information), you can compare the **IRQ settings** and **I/O addresses** of your devices to those assigned to the ports. (Interrupt request lines, or IRQs, let a hardware device request attention from the microprocessor. I/O addresses offer a way for the microprocessor to locate each device.) COM ports are assigned specific IRQ settings and I/O addresses. (See Figure 3.)

COM ports use IRQ settings 3 and 4; each of those settings is shared by two ports. The I/O address will be different, however. By finding out what IRQ settings and I/O address a device has, you can figure out which port it is using. Your user's manual should include the settings for the device.

MSD. Microsoft Diagnostics, or MSD, a program found in MS-DOS 6.0 and newer as well as Windows 3.1 and Win95, can give you information about what settings are assigned to each port. Again, they should match those in Figure 3, but sometimes you can alter those settings. If you're in Windows, exit to the DOS prompt. (*NOTE: Don't use the DOS prompt within Windows; you must be completely out of Windows for MSD to work best.*) At the DOS prompt, type **msd** and press ENTER. This takes you to the main MSD screen. There is a COM Ports button; if you click that (or press C, the highlighted letter for that option), MSD will give you the address of each active port. For example, our computer showed a port address of 03F8H for COM1.

Sometimes MSD gives inaccurate information about the ports. For example, if your computer is using ports COM3 and COM4, MSD may move these settings up so that it will appear that they are at COM1 and COM2. Therefore, to be sure which ports are being used, it's best that you go by the IRQ settings and I/O addresses instead.

MSD has a section labeled IRQ Status; open that to see all of the IRQs for your computer. The COM ports will be included in the list of IRQs. This will at least show you which of your COM ports are in use, so that if you know the IRQ address is 3, you'll be able to see whether that means the device is using COM2 or COM4.

One last tip: Once you find out which device is using which COM port, write it down and put it with other important computer records. Then you won't have to go through all of this again. ●

by Diana K. McLean

COM Port Settings

Port Type	I/O Address	IRQ Address
COM1	03F8	IRQ4
COM2	02F8	IRQ3
COM3	03E8	IRQ4
COM4	02E8	IRQ3

Figure 3: Each COM port usually corresponds to specific IRQ and I/O addresses.

5 Things That Make You Go Wow!

It was only 50 years ago when the world was wowed by the Electronic Numerical Integrator and Computer (otherwise known as ENIAC), a 50-ton system that could count to 5,000 in one-fifth of a second. Today, you can get a $40 calculator to do the same level of computations the ENIAC could perform. What once shocked the mechanical age now is a bit of nostalgia, retired to the Smithsonian.

Although the idea behind binary processing of 0s and 1s and offs and ons hasn't changed, computers still can amaze us. Besides analyzing gigantic numbers at dizzying speeds, PCs equipped with new software and hardware can help us go places we've never been before and be better prepared or even help automate our home. And when you consider the opportunities of communicating online, the possibilities become more intriguing.

Here, we've compiled five technologies that will "wow" your friends and don't require a degree in rocket science or computer programming to understand. Some can be as simple as adding a new software package to your computer or connecting to the Internet, while some are unconventional, calling for expensive hardware add-ons. But just how amazing are they in practice? To find out, we did a little field testing to see if we would still say "wow" when we were through.

Mapping The Open Road

One of the most practical, but still remarkable, things you can do on your PC requires a software package costing between $30 and $60. Mapping software takes the paper road atlas and zaps it with electronic options.

We examined several popular mapping products: Microsoft *Automap Road Atlas* (800/426-9400), Rand McNally *TripMaker 1996 Edition* (800/671-5006), and DeLorme *Map 'n'Go* (800/452-5931). In these programs, you enter a starting location, a few places you want to stop along the way, and a destination. Each program then maps a route, pulling up an itemized list of which way you go for how long and where to turn, with your total travel time. You can print this out and take it with you on the road. Both Automap Road Atlas and TripMaker include "wizards" that walk you through this planning process.

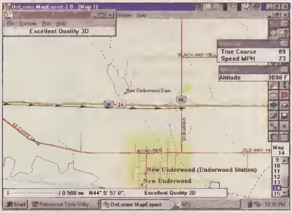
All three programs let you choose a quick or scenic/custom route and adjust the speed you plan to travel. The programs also can display extras on the map—things such as land features, parks, rest areas, attractions, hotels, and restaurants. For most of the items, you click the icons to view summaries with phone numbers to call for reservations or more information.

Although all three programs have features to help you find a place to vacation, TripMaker includes an Explorer Guide that directs you through vacation choices based upon your preferences and the time of year you are traveling. Then you can read more about the vacation sites, view photos or movies, and get prices, addresses, and phone numbers. TripMaker also includes a costs feature to calculate how much you will spend on fuel, lodging, food, and entertainment. Automap takes fuel planning a step further, calculating how much you should budget for gas based upon the fuel cost, tank capacity, and miles you expect to get per gallon. Try that with your old travel atlas. Although Map'n'Go doesn't feature any wizards, it does include more customizing options, such as letting you set exactly how fast you want to go and letting you pinpoint an exact address or ZIP code on the map.

If you're a regular road warrior, the Internet is a great tool to learn about where you're going before you get there. For example, once you know where you're going, use the computer to make reservations. To locate a hotel, try the Yahoo! search site at http://www.yahoo.com under the Recreation category, then Travel, then Lodging. Here, you can search through the Resort, Bed And Breakfast, Hotels, or Hostels listings. Another good tool is TravelWeb at http://www.travelweb.com. It's one of the largest online hotel reservation systems for booking a stay yourself. Browse the 6,000 hotels there, which include names such as Best Western, Days Inn, Hilton, Hyatt, La Quinta, Ramada, and Westin. Then book a room (5,000 listings offer this feature) with an arrival and departure date, type of room, name, address, and credit card number.

For a tasty place to eat, stop at DineSite (http://www.dinesite.com/), where you can search by city, ZIP code, or area code for restaurants. You can select the type of food and establishment to see restaurant listings detailing their addresses, phone numbers, and menus. Some also have reviews from diners.

DETOUR



GPS software is a lot like a personal "You Are Here" sign on your own map. It tells where you are, as you drive, and can zoom in and out of scale.

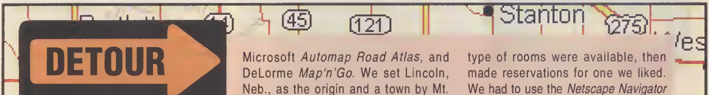
Where Am I?

Why stop at mapping your route? Your computer can keep you from ever stopping to ask directions again. Sure, you can take the maps and directions with you on the road, but what if you get so far off the beaten path that your well-drawn directions can't help you? If you're willing to pay the price, your portable computer can use global positioning satellites to tell you exactly where you are. This technology is similar to a big map, indicating "You Are Here" with your own personalized arrow.

The Global Positioning System (GPS) works by utilizing a constellation of 24 satellites, each giving off a radio signal carrying an identity code and the exact time the signal was sent. A special GPS modem picks up the signals and figures out where it is on Earth by comparing its own time to that of the satellites'. The modem takes readings from three satellites to get an accurate location. A fourth satellite can help pinpoint the modem's altitude, which is handy for aircraft GPS units or travel in the mountains.

A handful of systems now available will install a CD-ROM unit directly into your car dash. But we were more interested in systems you could add to a computer, more precisely, a laptop computer. The special GPS modems are expensive—about $500 to $1,000—and often can be found packaged with GPS software. There are very few companies that produce reasonably priced mapping products to accompany these modems. *City Streets for Windows*, now owned by Barentz Ltd. at (713) 266-7623, is a consumer-targeted product that sells for around $60 to $70. We tried a more expensive product from DeLorme called *MapExpert* 2.0 that sells for around $300. This software, along with being able to pinpoint addresses, includes drawing features that let you add to the maps.

Once the GPS modem zeros in on your address, it will put a dot on the map within



DETOUR

It all began when we fired up the old CD-ROM drive to locate a place to explore on a three-day weekend getaway. We tinkered first with Rand McNally's *TripMaker 1996 Edition*, which had the most planning features. We told its Explorer Guide where we wanted to travel (the Great Plains region), when we would be traveling, and the types of attractions we wanted to visit. It pulled up a lengthy list of vacation ideas. A video on Mt. Rushmore National Memorial in South Dakota, which was within our range, caught our eye. We also located a few hotels and eating establishments that fit the bill.

Next, we mapped our route using three popular programs: TripMaker, Microsoft *Automap Road Atlas*, and DeLorme *Map'n'Go*. We set Lincoln, Neb., as the origin and a town by Mt. Rushmore, Rapid City, S.D., as the destination. We indicated the times of day we wanted to travel and the quickest route. Rand McNally estimated (after we adjusted for South Dakota's new speed limits) that the trip was about 582 miles and would take about 8.5 hours if we took a roundabout course following interstate highways. DeLorme's Map'n'Go and Microsoft's Automap agreed that was the best route once we set the speed defaults, but they both estimated different travel times and miles.

Then it was time to make reservations. We went to TravelWeb on the Internet at http://www.travelweb.com to see if we could book a hotel online. After a quick search, we found a suitable Ramada Inn listing in Rapid City. We checked what type of rooms were available, then made reservations for one we liked. We had to use the *Netscape Navigator* Internet browser, however, to ensure that the transaction would be secure since we were using a credit card number to reserve the room. TravelWeb E-mailed us a confirmation with our reservation number and all the other important details.

Finally, we printed the directions and maps from the mapping packages. These were somewhat helpful, but the route was relatively simple, so we didn't need to consult them often. The rest areas option we plotted using Automap came in handy now and then, and we wished we had consulted the Automap materials regularly to check when to refuel instead of waiting for the last possible moment. . . .

Travelers in rugged terrain must face the fact that GPS signals may be as lost as they are.

about 100 feet of your exact location. It also can track other things such as speed, direction, and velocity. Some programs, such as MapExpert, let you **breadcrumb**, or leave marks on the map indicating where you've been.

While the cost of using the GPS system may put it out of reach for many average users, some business people and heavy travelers may find it indispensable when traveling in unfamiliar territory.

DETOUR

Phone Home

While we've been spoiled by telephones too long to be amazed by long-distance conversations, it may interest you to talk and avoid the long-distance charges. Although Internet phone technology has been around for more than a year now, the idea of cutting down on phone bills wowed us.

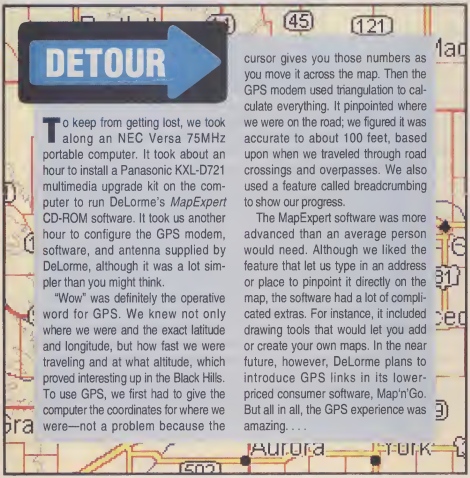
To "cheat" the long-distance company, you'll still need access to a telephone line, modem, sound card, speakers or headphones, microphone, and special software to connect and talk in real time to someone online. You'll also need an Internet **TCP/IP** connection, usually at least a 14.4 **kilobits per second (Kbps)** connection. (TCP/IP [Transmission Control Protocol/Internet Protocol] is a language governing communication between computers on the Internet. Kilobits per second refers to the speed at which a particular modem can transmit data.)

The catch, for now anyway, is that you can't just use your computer to call up someone on their phone. You must call over the Internet, and both of you must be using the same connection software. We tried *Internet Phone* by VocalTec, one of the earliest phone products. To talk to another person, your modem dials in to an Internet Phone **Internet Relay Chat (IRC)** network, which contains lists of people connected to the IRC and the topics of conversation. (An IRC lets users engage in real-time communication, usually through typed messages.) Select a topic and a name, then select the Call option. Now comes the other catch: If you want to talk to a specific person, you must prearrange a time when both of you will be online.

Internet phone products are a great way to get to know new people, a little like HAM radio. It also can help you keep in touch with family, friends, or business associates. To keep these conversations private, you can create a confidential topic located where only you and the person you want to talk to know where to look.

Want to try it for free? If you have an Internet connection, download the software from VocalTec's Web site at http://www.vocaltec.com. You can talk for free for about one minute, up to 30 days after you download the product. Then you must get a registration number, which is like purchasing the product, for about $70. In the free time allotted, you probably can receive or make a short call. Most sound cards today, however, are only capable of **half-duplex** sound. That means that only one person can talk at a time while the other listens and waits for a turn. A few **full-duplex** sound cards are available for interactive conversations. For instance, IPC Peripherals (510/354-0800) recently announced a Cyberchat card, which is reasonably priced at about $100.

Actually, there are several phone choices other than the Internet Phone. Log into Quarterdeck's *WebTalk* at http://www.qdeck.com/qdeck/products/webtalk/ or Netspeak Corp.'s *WebPhone* at http://www.itelco.com/. Both have free trials and cost about $50 for the full versions. The WebPhone works a little differently; instead of going through a special



DETOUR

To keep from getting lost, we took along an NEC Versa 75MHz portable computer. It took about an hour to install a Panasonic KXL-D721 multimedia upgrade kit on the computer to run DeLorme's *MapExpert* CD-ROM software. It took us another hour to configure the GPS modem, software, and antenna supplied by DeLorme, although it was a lot simpler than you might think.

"Wow" was definitely the operative word for GPS. We knew not only where we were and the exact latitude and longitude, but how fast we were traveling and at what altitude, which proved interesting up in the Black Hills. To use GPS, we first had to give the computer the coordinates for where we were—not a problem because the cursor gives you those numbers as you move it across the map. Then the GPS modem used triangulation to calculate everything. It pinpointed where we were on the road; we figured it was accurate to about 100 feet, based upon when we traveled through road crossings and overpasses. We also used a feature called breadcrumbing to show our progress.

The MapExpert software was more advanced than an average person would need. Although we liked the feature that let us type in an address or place to pinpoint it directly on the map, the software had a lot of complicated extras. For instance, it included drawing tools that would let you add or create your own maps. In the near future, however, DeLorme plans to introduce GPS links in its lower-priced consumer software, Map'n'Go. But all in all, the GPS experience was amazing. . . .

DETOUR

The impressiveness of GPS made up for the less-than-amazing phone call via the Internet. Well, it wasn't so bad, but it didn't show many advantages over the regular phone system. We used the sound card and microphone in the multimedia upgrade kit, the modem in the portable, and our company's Internet service account to check in for messages. Once connected to VocalTec's Web site, we downloaded a free demo of *Internet Phone*, then called a member of *PC Novice*'s editorial staff.

We found that while this "wow" technology sounds good, it may take just the right setup to actually "beat the system." We had to arrange ahead of time what IRC server we would use and what time we would go online. Then, because we didn't have a modem that could do full-duplex calling, we each had to wait our turn to speak. And our scenario actually wasn't ideal because our Internet service provider didn't offer an 800 access number or an access number in the area we traveled to, meaning we also paid for a long-distance Internet connection call. We noted that in the future, we would try one of the systems that let you dial other users directly via their Internet addresses, as we received calls from three gentlemen before we actually connected with the office.

When we finally reached Rapid City, we pinpointed the address of our hotel, and the mapping software led us right to it. When we checked in, everything went as planned. The Internet reservation system worked great, just as if we had made the reservations over the phone.

During the trip, we never worried about getting lost. After we took a turn down a lonesome dirt road, the GPS program helped us find our way back to the main highway, although higher hills and the tall trees of the Black Hills occasionally confused the program and interrupted our satellite connection. . . .

network, you must know the other user's address. (Netspeak offers assistance in finding other registered users.) WebTalk can work through an IRC or as a point-to-point product.

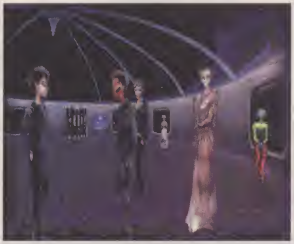
DETOUR

Head Honcho Of The House

One of the neatest things you can do with your computer is home automation. Hook up your lights, appliances, thermostat, automatic sprinklers, television, and radio to a computerized system that would turn these things off or on when you tell it to. Talk about being head of the household.

While many systems cost thousands of dollars to automate your home, we found one for $99 that works with your computer and lets you control three devices. We tested X-10's Home Control PC Interface Kit, PC5290, which consists of software, a controller unit, and three modules for a lamp, appliance, and universal device (such as a sprinkler system or drapery control). What can you control? A lot more than you would think. Most household appliances, such as televisions, stereos, heaters, fans, window air conditioners, humidifiers, coffee pots, etc., plug into the module devices.

The X-10 controller did most of the work. The system consists of power-line carrier (PLC) devices that communicate using the existing power line wiring. The controller sends out signals to the modules, telling them when to turn on or off or when to dim or brighten. The computer's job is primarily to program the controller. You use the PC's interface and menu options to program your settings. For instance, you may use the Scheduler to program a "Morning Wakeup" scenario, setting a time at which the unit would turn on the coffeemaker, the television, the ceiling fan, and the lights. This way, you don't have to keep your computer running to control the system.



At the Worlds Chat Internet service, you can walk around a three-dimensional "space station" as an avatar of your choosing, talking to other visitors or exploring different levels.

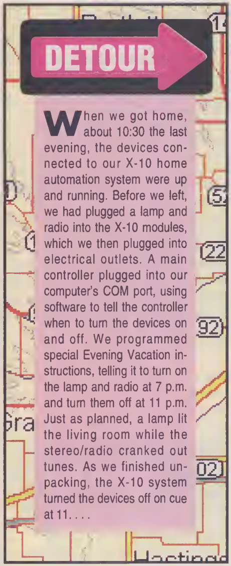
If you really get addicted to such power, you may end up doling out a bit of money to buy more modules (about $15 apiece), as the unit we had could control up to 256 modules. X-10 (201/784-9700) units are a little more affordable than others, and the software is available in DOS and Windows versions, even for DOS version 2.0.

Sure, there are other systems available for even more control and more money. For instance, NetMedia Inc. (520/544-4567) offers TABS, the Totally Automated Building System. It requires a little wiring and extra work, making it necessary to go through a TABS dealer who will set up the system and program it exactly as you want. For about $6,000, TABS will speak to you and let you control home security, irrigation, climate, lighting, and other appliances from a remote control, wall panels, or touch-tone telephone. That's impressive.

DETOUR

Out Of This World

Does the idea of creating your own identity and staking your claim on the Internet make you go "wow?" Well, there's an easy, although relatively



When we got home, about 10:30 the last evening, the devices connected to our X-10 home automation system were up and running. Before we left, we had plugged a lamp and radio into the X-10 modules, which we then plugged into electrical outlets. A main controller plugged into our computer's COM port, using software to tell the controller when to turn the devices on and off. We programmed special Evening Vacation instructions, telling it to turn on the lamp and radio at 7 p.m. and turn them off at 11 p.m. Just as planned, a lamp lit the living room while the stereo/radio cranked out tunes. As we finished unpacking, the X-10 system turned the devices off on cue at 11. . . .

unknown, way to hang your shingle in cyberspace. A few companies have established three-dimensional (3-D) worlds on the Internet, called **habitats**. In these virtual environments, users are represented by animated characters called **avatars**, talk through cartoon bubbles, and commune in 3-D buildings.

Although the experience has only begun to really catch on, habitats and avatars have been around for years. One of the first habitats was a pilot developed at Lucasfilm in 1985. About 500 or so participants designed their cartoonish avatars in order to interact and chat with others in an imaginary world. Users could communicate, play games, go on adventures, fall in love, get married, start businesses, found religions, and wage wars.

Today, there are a few commercial online communities where you can stake your claim. For instance, we experimented with Worlds Inc.'s new AlphaWorld. It offers a free trial you can download from http://www.worlds.net, or you can buy a registered version in stores. We were amazed that such a 3-D world could exist online without any special equipment or a special Internet browser. You walk through a courtyard with trees and benches to encounter other users. When you talk to other people, your name and message appear above your head. You can fly and have an out-of-body experience (literally), explore the terrain, or take one of the swirling gateways to another online area.

But you don't need all these devices to be wowed by what your computer can do. The one remaining item we featured can take you on a trip to another world and won't cost you nearly as much. We traveled via the Internet to Worlds Inc.'s AlphaWorld, a virtual habitat with three-dimensional (3-D) characters called **avatars**. Using the nickname Jughead, we walked around a courtyard, attempting to spark up a conversation with other avatars. As we talked, words appeared above the avatar's head. Some avatars were more than willing to say "hi" and chat for a short while, but most wandered aimlessly, talking to no one. Next, we traveled through a gateway to one of the residential areas where users had built elaborate homes. Although it requires only a little cutting and pasting, building a home isn't as easy as it seems, especially when it comes to locating a plot to build on.

When we visited AlphaWorld, it was still in a preliminary stage, only offering a few avatar options, such as a surfer, a computer geek, a toga-wearing Greek, or an Egyptian-like goddess. Eventually, it will have more options and areas, especially if you register and pay for your citizenship. But even in this early stage, there is already a sense of community, Rob Schmults, director of marketing at Worlds Inc., says. Some users even throw virtual parties. Among the future features may be a virtual mall for online shopping. ○

If you want a place to really call your own, AlphaWorld lets you build a 3-D home with windows, doors, and landscaping from available objects or by copying and pasting objects other users have contrived. Some people are really ambitious, while others have just laid claim to a spot for links to their Internet E-mail addresses (usually through a little 3-D mailbox) or their Web pages. Don't waste your time in AlphaWorld if you have anything less than a Pentium computer with about eight megabytes (MB) of random-access memory (RAM) and a 28.8Kbps modem.

Again, AlphaWorld isn't the only 3-D habitat. Worlds Inc. also offers a Worlds Chat site where you can chat via avatar, though you can't create a home. Other habitat examples include Worlds Away through CompuServe, V-Chat by Microsoft and the Microsoft Network, Intel's Moondo, and IBM's Virtual World (which has a free demo at http://www.software.ibm.com/software/virworld.html). There are other habitat sites, but many are in prototype stages. One promising site is http://www.probotics.com/home.htm where Probotics is creating a 3-D world called VScape that would let users create their own avatar and talk, rather than type, with others.

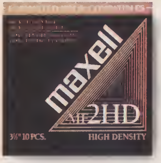
DETOUR

■ Wow! But . . .

Looking back, the trip had its problems. We encountered heavy tree cover that cut out our GPS connection in areas of the Black Hills, long-distance charges for Internet access, and a burnt-out circuit breaker in the car's cigarette lighter that had to be replaced in order for the GPS modem to power up. But the trip reinforced something we knew all along: While technology is amazing, it isn't always foolproof. Don't chuck your paper atlas just yet. ●

by Cindy Krushenisky

ADVANCED DATA TECHNOLOGY



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An Inside Look At Anatomy Software

Breathe in. Breathe out. Breathe in. Breathe out. Luckily, this is one of the bodily functions we don't have to think about. Breathing, sneezing, and coughing are all things our bodies do without our asking. The body is an independent machine of living, breathing tissue that most of us take for granted until something goes wrong. We learn as much as we need to know to keep ourselves going and let the rest remain a mystery rather than try to wade through a numbing anatomy lesson.

Multimedia technology can make those old anatomical studies more interesting by adding colorful illustrations, animations, and convenient dictionaries to the inevitable text and narration in the popular educational anatomy products directed at children and adults.

For Kids Only

Children's anatomy packages generally don't go into specific detail about individual muscles or arteries; they concentrate more on identifying the body's systems and how they work together to keep us playing and doing our homework.

The Magic School Bus Explores The Human Body. Microsoft's *Magic School Bus* series takes children to places not easily traveled by conventional methods. The anatomy lesson, enhanced by an exploration of the human body, is one of the more unusual field trip ideas for kids ages 6 to 10. The result is a colorful, detailed, and informative learning tool for teaching body basics.

Before entering The Magic School Bus to begin the field trip, Microsoft places young explorers in an interactive classroom that contains games, a basic outline of the adventure ahead, and interactive pictures that move when clicked. The two guides, Ms. Frizzle (teacher and chaperone) and Liz (a helpful lizard), explain what to expect from the virtual program and how to use the tools provided. Both guides are careful to stress that the entire trip is make-believe and that this is not something children should be trying at home. "You can't drive a school bus into someone's mouth," Liz reminds explorers. This may seem a little obvious, but it's indicative of the steps Microsoft takes to make sure kids have all the facts.

The Magic School Bus includes a passport with stickers that children color themselves to log the different stops the bus makes as it travels through the body to the major organs. To help users look at the big picture or plan a route, the organs are all displayed in their proper places on a map of the entire body, which is kept neatly in the glove compartment of the bus.

Kids travel the body piece-by-piece or jump among organs. Each organ is accompanied by fact tidbits, a science lesson, and a related game. The result is an animated lesson on the location of the various body parts and their functions.

One drawback to the package is the lack of a user manual. The information can be located through the help functions within the program, but with so many features and things to look at, hard-copy documentation would be easier to use when trying to navigate the program.

Body Park. This program, for ages 4 to 10, goes through six of the basic body parts: brain, mouth, skeleton, heart, muscles, and lungs. The organs are placed on a map in a semi-anatomically correct fashion. However, to illustrate the exact anatomical positions, the organs light up on a figure to the side of the map.

At each attraction in *Body Park*, children learn interesting facts about the respective body part and how it functions as part of the whole picture. Each organ attraction has three main features: a lesson, an experiment, and an anatomy-related game. For example, youngsters learn that the heart is a giant muscle that contracts to push blood through the rest of the body, carrying oxygen to the cells. The games help reinforce the information provided throughout the lesson and the experiment.

Body Park also includes lessons on family and nutrition to add health issues to a scientific program and to teach children how to take care of the mysterious organs under the skin. Of course, a majority of the educational information will be over the heads of the average 4-year-old, but the colorful interactive environments will entertain the younger users and eventually teach elementary anatomy without making it seem like a lesson.

3-D Body Adventure. This program's box advertises that it's for children ages 7 and up, but *3-D Body Adventure* seems to be targeted for a more mature audience. While there's nothing that's inappropriate for a 7-year-old's eyes, the kids simply may not understand the technical terminology. However, the imagery accompanying the lessons may entertain until children grow into the content.

The three-dimensional (3-D) graphics that illustrate several organs lend a view that isn't necessarily more accurate than the other products', but it definitely has a different twist. The program contains a representative cross-section view of the human body. You can view it from three different angles, but you should be prepared for realistic (and graphic) images. The cross sections show bone, muscle, and fat layers in a photographically realistic representation of the human body. The one disappointment with this feature is that the 3-D viewer only works with a select number of images.

The 3-D movie theater is one of the more interesting features. There are 15 movie clips to choose from, which feature the heart, eye, muscle, skeleton, brain, and ear. These snippets illustrate bodily functions, such as the dilation of the pupil, a brain synapse, or a heart attack, in vivid 3-D detail.

The games that accompany the educational information are mildly entertaining, though somewhat repetitive. The language used in 3-D Adventure probably will be a little beyond a 7-year-old child, but for an older age group (such as a high schooler), the program is informative and interesting.

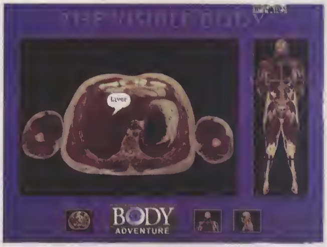
For The Whole Family

Although family-oriented programs contain information that children's software might avoid, they aren't X-rated by most standards. They are simply reference tools for someone with an interest in seeing what makes us tick.

The Virtual Body. This program by IVI Publishing provides a complete multimedia anatomy experience. Illustrations, pictures, and video clips help illustrate the narrated tutorials. Basic anatomical information about body parts—where they are, how they work, how they work together—is accompanied by interesting tidbits and little-known facts. For example, one highlight, Did You Know?, shows users that "the smallest bones in your body—the stirrup, the anvil, and the hammer—are in the ear."

Users can watch the ultrasound video of a fetus, see an animated clip of a blockage forming in the heart, and sift through the various systems that work together to form the complete person. Most of the visuals are illustrations and animations that give a graphically detailed image without the dissection-lab feeling. The X-rays sprinkled throughout the program add a view of the body's inner workings that isn't possible in any other manner.

The program is rounded out with a series of "mini-labs" and challenging games that successfully test and reinforce knowledge gathered in the CD-ROM's lessons. The program does an excellent job of making a thorough scientific program both educational and interesting.



***3-D Body Adventure* uses cross sections of a photographic representation in its segment The Visible Body.**

The Virtual Body doesn't necessarily go through the specific internal workings of the body. It tends to pick and choose the points of interest and doesn't really give a comprehensive anatomy course. The specific diagrams are informative, but without the whole picture to use as a reference, the interesting bits are a little fragmented. Virtual Body is a fun, intriguing supplement to a more thorough (but possibly more dry) anatomical lesson.

BodyWorks. *BodyWorks* illustrates six of the basic body systems in 3-D: skin, fatty tissue, muscles, organs, circulatory system, and skeletal system. Users select points of interest from the larger main illustration to view more closely. Whether you're viewing an entire skeletal system or a close-up of the jaw bone, the image can be rotated at a variety of angles for a more detailed look at the body's building blocks. These 3-D models have a lot of potential, but unfortunately, they aren't labeled in any kind of detail. As a result, they are striking but void of any really useful information.

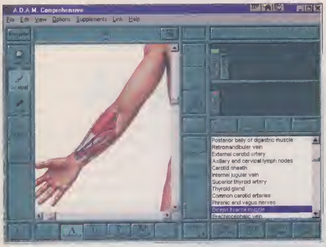
The BodyWorks Lessons section makes up ground where the 3-D illustrations fail. By being a little more specific, BodyWorks expands the number of topics to be covered to nine biological systems and three more general categories. From within the lessons, users can begin to identify specific body parts and learn their functions both individually, as part of a system, and ultimately within the body. BodyWorks is designed for the adult user and contains many more scientific terms, but each questionable term is linked to a definition in the glossary. Just click a highlighted word for an instant definition. Instead of avoiding terms that may lose the user, BodyWorks provides an efficient and effective way to learn them.

If the textual matter doesn't properly clarify the anatomy lesson, Doctor BodyWorks can provide a well-illustrated narrative to make any points of confusion more clear. The program's accompanying quiz show game, Body Basics, includes a method of testing your knowledge once the lessons have been adequately covered.

BodyWorks' language may be a little dry for children, but it's extremely helpful and a good reference for students who have an interest in anatomy or the discipline to read through the lessons.

A.D.A.M. ***The Inside Story.*** Users find themselves on a personal level with the anatomical animations of *The Inside Story*. Adam and his partner Eve invite you to look at the various anatomical systems under their skin and to learn the body parts and their functions. Whether explaining a male or female body, the makers of A.D.A.M. wanted The Inside Story to be a family-oriented program and provided Adam and Eve with fig leaves for their private organs. During the initial setup of the program, users can choose to make the protective covering and the entire reproductive system section optional or block access to that option so those aspects remain protected.

The Anatomy screen illustrates a figure, male or female, that will peel away its layers one-by-one in an effort to display the parts that make up internal functions. As the layers peel away, users can point to a part to display an identification label. These labels and some of the medical terms do get a little technical, but The Inside Story provides a quick reference



In *A.D.A.M. Comprehensive*, you can perform a virtual dissection. The list to the right of the main screen highlights the terms for each layer revealed.

dictionary to help decipher the smattering of more complicated terms and explanations.

In addition to the screen that lets users pick and choose explorations, Adam and Eve have compiled a Family Scrapbook arranged according to the various systems. The Family Scrapbook gives detailed lessons on each system and the body parts it contains. Illustrations and color animations present the scientific material in a nonscientific, down-to-earth manner, making the complex inner workings of our bodies easy to understand for any age group. The lessons also are accompanied by health and safety information that's important for keeping those parts functioning properly.

If users want to bypass the more lengthy lessons and go straight for the animated lessons that interest them, they can do this through the Animations menu. These are the same animated lessons contained in The Family Scrapbook without all of the transitional entertainment. Puzzles finish off the package by illustrating, interactively, how several organs work together to complete one task.

Serious Anatomy

Learning about what makes people tick may be a hobby for some, but it's mandatory for others. Future doctors and would-be medical technicians must absorb an incredible amount of information about the human body. While the programs reviewed so far are for the average consumer, there are others that present information in greater detail for the serious anatomy student. Here is a quick look at some of the more technically demanding products.

Human Anatomy from Gold Standard Multimedia assumes users have a basic knowledge of all the information covered in the educational products reviewed above and begins several levels higher. Step-by-step, this program will take users through the dissection process, illustrating each step with photographs from a true cadaver dissection. Another offering in Gold Standard Multimedia's collection is *Radiologic Anatomy*, which contains a collection of X-ray films that illustrate the intricacies of the bone structure.

The Visible Human is a graphic program that's made up of a collection of cross-section photographs that give an accurate picture of what humans look like under their skin. This CD-ROM is the result of a joint effort by the National Library of Medicine and the University of Colorado Health Sciences Center. The researchers selected a 5-foot-8-inch, 180-pound male who died of a drug overdose as the subject for the photographical portion. The Colorado Health Sciences Center conducted two types of scans while the body was fresh in order to illustrate live tissue. The body then was frozen in a block of gelatin, cut into sections, placed under a digital camera for the original shot, and photographed. A millimeter-thin slice was shaved from the section, and the body was photographed again. This continued until the whole library was complete. This somewhat morbid-sounding application provides some interesting, true-to-life views of the body.

A.D.A.M. Comprehensive is a slightly less conversational and more informational version of The Inside Story. The point of A.D.A.M. Comprehensive is basic anatomical display and identification. Users can look at any one of 12 biological systems or practice a virtual dissection process. To dissect, use a virtual scalpel to make an incision and pull back the top layer to reveal the layer underneath. With each incision, the list of nerves, muscles, organs, and other miscellaneous anatomical features highlights the names of the exposed parts. Unlike the other products in this section, A.D.A.M. Comprehensive uses illustrated graphics for its demonstration. The drawback, but also the benefit, is that A.D.A.M. Comprehensive is less realistic than the other three products.

After looking at these anatomy programs, you'll better understand all the hard work that goes into keeping humans breathing . . . and moving . . . and thinking . . . and playing . . . . ●

by Elizabeth Panska

For More Information:

3-D Body Adventure
$30 street price
Knowledge Adventure
(800) 542-4240
(818) 246-4400

A.D.A.M. Comprehensive
$995 direct
A.D.A.M. The Inside Story
$40 street price
A.D.A.M.
(800) 755-2326
(770) 953-2326

BodyWorks 5.0
$45 street price
SoftKey
(800) 227-5609
(617) 494-1200

Body Park
$50 direct
Virtual Entertainment
(800) 301-9545
(617) 449-7567

Human Anatomy
Radiologic Anatomy
$99 suggested retail price
Gold Standard Multimedia Inc.
(800) 375-0943
(904) 373-1100

The Magic School Bus Explores The Human Body
$40 street price
Microsoft
(800) 426-9400
(206) 882-8080

The Virtual Body
$40 street price
IVI Publishing
(800) 952-4773 ext. 190
(800) 432-1332
(612) 996-6000

The Visible Human
$495 direct
Research Systems Inc.
(303) 786-9930

Be Two Places At Once With

Remote Computing

Gleason

Between responsibilities at work and home, we all seem to be busier than ever. You need to work late on that important proposal, but your daughter's dance recital is tonight. You need to travel to Los Angeles to secure an important deal, but you can't afford to be out of touch from the office network for the three-day trip.

How can you be in both places at once? Because you probably will never find your perfect twin, you can use remote control software packages. These programs let you use the computer at which you're sitting (called the viewer or **remote computer**) to control another computer (the **host**).

Most connections between the host and remote computers are made via modem, although you can use a network connection or a serial cable as well. Depending upon the chosen security features, you can work at the remote computer as if you were sitting at the host PC, using its programs and accessing its files.

"We're in the business of providing people with remote control of their PCs so they work just as if you were sitting in the office," says Michael Kerman, director of product management for Symantec, a leading maker of remote control software. "You could be at home, you could be on another coast, you could be in another country, and yet we could work together in real time on the same document. . . . It provides a lot of flexibility in terms of working."

We'll look at some of the issues involved in remote control computing before reviewing the features contained in five of the top programs.

Speed And Licenses

Ross Pfaff, of Depew, N.Y., runs a driving school and uses *LapLink* to transfer files from home to work. He uses identical 28,800 bits per second (bps) modems in both places and has had few problems making solid connections.

"I've never lost a file," he says. "I've never had a file go bad on me yet."

Using the fastest modems possible is important when using remote control software because one of the drawbacks you'll find is working speed. Much of your remote computing time is spent waiting for screens to redraw and for your commands to travel across phone lines or network cabling to the host computer.

"We recommend 9600bps modems and above," Kerman says. "We always tell people you're better off investing in a higher-speed modem than a higher-speed PC (for remote computing)."

When computing remotely, Pfaff says, many people fail to use their modems to their full capacity because they don't use the proper settings.

"It's important to make sure they have the proper modem setup so it's optimized for speed," he says. "The other thing is to make sure you set it for the highest settings your modem is capable of so you don't get any limitations from Windows 95 itself."

At J.R. Robson High School in Vermilion, Alberta, Canada, students have been able to do homework this year by dialing into the school's network from their home computers. The school's computer coordinator, Lyall Einhorn, says the school's remote control software, *ReachOut*, has worked extremely well. But the school ran into a couple of problems it wasn't expecting.

For students at home to use programs installed on the school's network, for example, the school had to resolve some software licensing questions, which concern users' rights to run software in different situations.

"Major companies get very testy on the licensing because you're actually sitting offsite running a site license," Einhorn says. "To appease all of these groups . . . we don't allow file transfer, but there is that capability. We just turn that off here at the school. You can print at home, but you can't transfer files."

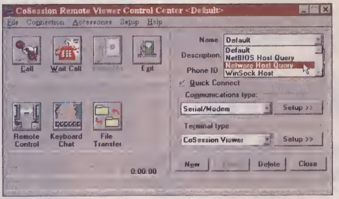
Also, each person's home printer had to be configured on the school's network before the students were able to print documents at home using the remote control software, Einhorn says.

Configuration wasn't a major issue with the four mainstream programs we considered. All were relatively easy to install, although you'll need to know your modem brand, speed, and location (the COM port it's attached to). Most programs use easy point-and-click interfaces, and all of them have Win95 versions. All have solid, customizable security features as well. Kerman says recent improvements in providing user-friendly features were a necessity because many novice users are buying remote control software.

"With the exception of their America Online or *Internet In A Box*, this often is the first telecommunications product they're using," he says.

CoSession

The recently released *INSYNC CoSession Remote 7.0* from Artisoft offers numerous performance and feature enhancements over its predecessor, *CoSession for Windows* from Triton Technologies. For budget-conscious users, one of the best features is the estimated street price—$79 for a version with licenses for installation on two PCs.



The interface for *CoSession Remote*'s Viewer Control Center window is simple to use.

You can make connections via Win95, Windows 3.1, or DOS through a network, modem connection, or the Internet. File-transfer speed has improved, and CoSession's setup program is one of the best, automatically detecting the location of your modem and its maximum transmission speed. Here's how to use CoSession's Keyboard Chat feature:

1. You need to establish a remote connection with the host computer. Start your CoSession Viewer program. Then click the phone book entry of the host computer to which you want to connect and click the Call button. After the connection is made, you have two choices to open the Keyboard Chat window.

2. In the Remote Control window (where the host computer's screen appears), click the Control menu and select the Keyboard Chat command.

You also can click the Remote Viewer Control Center window to bring it to the front, then click the Keyboard Chat button.

3. With the Keyboard Chat window open on the viewer computer, click the Attention button or begin typing in the Your Text portion of the window to open the Chat window on the host computer. You now can type a real-time conversation with the person sitting at the host computer.

In the past, CoSession lagged well behind other remote control programs in speed and features. While it has made many solid improvements, CoSession still is an economy model compared to the other luxury remote control packages available.

LapLink

With LapLink for Windows 95 from Traveling Software, remote control users can perform their file transfer, chat, and remote control functions over the Internet as well as through a direct modem connection, direct cabling, or an infrared connection.

LapLink initially carved its niche in the computing world through its file-transfer capabilities, later adding the remote control features. Naturally, LapLink's file-transfer features are especially strong.

The ability to connect through the Internet could save you or your company a significant amount of money, especially if the offsite, remote users are incurring long-distance telephone charges when using remote control. The Internet feature, however, is only available for computers running Win95 with the Microsoft TCP/IP (Transmission Control Protocol/Internet Protocol) stack installed. (TCP/IP is a standard that controls communication on the Internet.) Here's how to make a remote control connection through the Internet via LapLink:

1. You must enable your TCP/IP port in LapLink. Left-click the Options menu and select the Port Setup command. Left-click the TCP/IP port option, then left-click on and place a check mark in the Enable Port box. Left-click the Close button to save your changes.

2. Open the Connect menu and select the Connect Over Dial-Up Networking command if you use an Internet provider.

If you can connect directly to the Internet through your company's TCP/IP network, open the Connect menu and select the Connect Over Network command instead.

The file-transfer capabilities are one of *LapLink for Windows 95*'s most solid features.

3. Then left-click the TCP/IP Addresses tab and type the address of the computer to which you want to connect. Place check marks in the boxes of the types of services you want to use (file transfer, remote control, and chat). Left-click the OK button to begin the process.

If you use an Internet service provider to connect to a host computer, you might have some problems establishing a constant IP (Internet Protocol) address. Internet providers assign random addresses to each computer as they're connected. Traveling Software corrects this problem by providing a special server, called a WINS server, for free to registered users. The WINS server provides a constant IP address for your computer. When using this feature, you must enable WINS resolution in the Win95 Control Panel's Network feature.

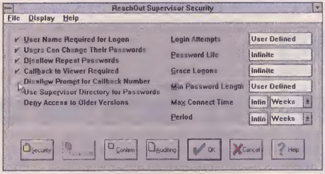
For more information on using an Internet connection through LapLink, visit Traveling Software's World Wide Web site at http://www.travsoft.com, or see the special user guide included with the software.

LapLink contains both its 16- and 32-bit versions in the same package, meaning you don't need to purchase additional software when switching between the two modes. LapLink isn't configured for Windows NT, though. The program does manage easy file sharing between computers using Win95 and Windows 3.1, even when using long file names with Win95.

pcANYWHERE

Symantec Corp. has always been among the leaders in remote control software providers, and *Norton pcANYWHERE32* remains a solid option. This package for Win95 and Windows NT contains all the basic features you'd expect to find, as well as easy access to online services, Win95-like features (including step-by-step Help instructions and use of the right mouse button), and quick file transfer and remote control.

Security is one of pcANYWHERE's best features, though. It contains Symantec's *Norton AntiVirus* program, which is one of the market's top packages. All files are automatically scanned for viruses before they are transferred from machine to machine. You can create individual security levels for specific users as well. We'll show you how to protect your computer's drives from access when it is set up as a host.



✓ User Name Required for Logon
✓ Users Can Change Their Passwords
✓ Disallow Repeat Passwords
✓ Callback to Viewer Required
Disallow Prompt for Callback Number
Use Supervisor Directory for Passwords
Deny Access to Older Versions

Login Attempts: User Defined
Password Life: Infinite
Grace Logons: Infinite
Min Password Length: User Defined
Max Connect Time: Infin Weeks
Period: Infin Weeks

***ReachOut* from Stac Inc. contains security features that can be customized to meet your needs.**

1. Left-click the Be A Host PC button. If your computer is going to be accessed via modem, right-click the Modem icon, then select the Properties command from the pop-up menu.

2. Left-click the Callers tab. Then left-click the Specify Individual Caller Privileges button.

3. In the Callers window, you'll see icons for each remote user who has been given access to your host computer. Right-click the remote user whose properties you want to change. Select the Properties command from the pop-up menu.

To add a remote user, right-click the Add Caller icon, then choose the Invoke The Wizard command. Follow the on-screen directions to add the remote user.

4. Left-click the Advanced tab, then left-click the Drive Access button. You now can choose to give this user no access, read-only access, or full access for each drive on your host computer, including the diskette drive, hard drive, CD-ROM drive, and network drive. Left-click the OK button after setting the desired access levels.

With pcANYWHERE, you can customize the program to meet your needs, including creating command strings that automatically handle tedious tasks such as file transfer and easily customized button bars to place the features you use most often one mouse-click away.

ReachOut

With *ReachOut* from Stac Inc., users can work on any combination of DOS and Windows computers. Running ReachOut for the first time is a fairly simple procedure. Here's how to establish a connection to a host using ReachOut through a modem:

1. Turn on the host computer and start ReachOut Host by selecting the ReachOut Host icon in the ReachOut program group. (If ReachOut Host is already started, you'll see it as an open window on the screen or as a minimized icon, and it is ready to receive.)

2. Turn on the remote computer and start ReachOut Viewer by selecting the ReachOut Viewer icon in the ReachOut program group.

3. You now can make the connection. Left-click either the Remote Control, File Transfer, or Chat button to tell ReachOut what type of connection you want to make. Now select the host computer's telephone number from your phone book or type the number in the telephone number box. Left-click the OK button.

You might be required to provide the user name and password for the host computer, depending upon the security setup you've chosen. Left-click the OK button. Again, depending upon your security setup, you now might receive a callback from the host computer. ReachOut will handle the telephone connection between the two computers if a callback is required.

4. After connecting via ReachOut and completing your work, you disconnect by left-clicking the Disconnect button, followed by the OK button. Left-click the Exit button to close the ReachOut program.

ReachOut's built-in *RapidSync* program allows automatic synchronization of files on two computers. For security purposes, ReachOut contains *IntruderGuard*, a built-in program that monitors computer connections for unauthorized access. If hacking is suspected, IntruderGuard will shut down a host computer or close a user's account.

eXpertise

Quarterdeck eXpertise software from Quarterdeck Corp. appeals to a different market than the other packages we've introduced because it allows remote computing using a Windows interface on a **Unix** host computer. (Unix is a text-based operating system used on numerous computers and on many Internet applications.) You can use a simple modem connection to access the host computer through the built-in program *Serial Xpress*, which contains compression features to speed your session.

If you usually are stuck with a Unix interface on your network computer, Quarterdeck eXpertise can provide an additional benefit: You can use a Windows interface on your PC to access the Unix programs. Many people are more comfortable using a Windows interface rather than Unix.

Unless you're fairly familiar with Unix terms and Unix itself, you probably won't want to tackle the setup and installation of Quarterdeck eXpertise without some help from the system administrator. We found the user guide and the setup fairly confusing, and we don't recommend it for most novice users. Because you'll be using Quarterdeck eXpertise with a Unix network host, though, most companies probably will have a system administrator perform the setup functions for you. ●

by Kyle Schurman

INSYNC CoSession Remote
$79 (all prices are estimated street price)
Artisoft Inc.
(800) 846-9726
(520) 670-7100
http://www.artisoft.com

LapLink For Windows 95
$149
Traveling Software
(800) 343-8080
(206) 483-8088
http://www.travsoft.com

Norton pcANYWHERE32
$149
Symantec Corp.
(800) 441-7234
(503) 334-6054
http://www.symantec.com

ReachOut
$100
Stac Inc.
(800) 522-7822
(619) 794-4300
http://www.stac.com

Quarterdeck eXpertise
$395
Quarterdeck Corp.
(800) 354-3222
(310) 309-3700
http://www.qdeck.com

Auditing Accounting Software

Small-business owners are among those who have reaped the greatest benefits from the computer revolution. Armed with the right pieces of computer equipment, small-time entrepreneurs now have the chance to reduce operating expenses and gain more in-house control of their business enterprises.

For example, modems let small-business owners send business communications via E-mail or fax, both cheaper and faster options than first-class postal service. Color printers and desktop publishing software give any small-business owner the chance to produce low-cost, high-quality pamphlets and brochures. But perhaps more impressive than either of these developments are the improvements that have been made in the way small businesses manage their finances.

In the not-so-distant past, small-business accounting involved stuffing the day's receipts into a manila envelope that was sent to an accountant's office the next morning. Or, if someone in the company was familiar with common bookkeeping practices and principles, the company records were entered by hand into a general ledger. Checks and receipts either were typed or hand-printed, and calculating depreciation and interest payments involved the processing of complex mathematical formulas.

But today, for less than $200, small-business owners can purchase an accounting program that integrates, in one package, all the tools needed to manage and organize many of the financial affairs conducted by a small business.

The benefits of digitizing the financial information of a small business are obvious. In short, it completely automates the process of accounting. Instead of using a sharp pencil to manually enter all of a business's transactions into a general ledger, the accounting software lets you type it in on a keyboard. While this may not seem to account for much of a difference, it may substantially improve accounting efficiency in many ways:

- Accounting programs automatically apply information to various ledgers, eliminating the need to thumb through numerous journals and notebooks to find all the accounts affected by a single transaction.

"What small-business accounting software can do is eliminate the grunt work involved in keeping track of the finances of an organization," says Christopher Lee, president of BestWare, the makers of *MYOB Accounting*.

- Accounting records can be backed up easily to diskettes and other storage devices, protecting a business's financial records against loss and theft.
- In case of audit, your accounting records will be well-organized. This doesn't benefit the IRS only, though; search features let you find within seconds a specific piece of information that would have taken minutes or hours to find in a file cabinet.
- The charts and graphs included with these software packages let you make educated marketing decisions because you are constantly aware of the fiscal status of your business.

"Our customers literally run their business with it," says Vicki Duffey, product line manager for Peachtree Software. "It's not just an accounting package but really more of a way to run their business—a way to track the whole selling process."

- Accounting programs make it easier to keep track of accounts receivable and accounts payable. Most programs can calculate interest payments, and some automatically track accounts receivable until the final payment is made.
- Finally, anything that can improve operating efficiency is bound to significantly reduce operating expenses. Doing data-entry duties in-house will substantially reduce the amount of time—and thereby the amount of wages—spent fulfilling accounting tasks.

"We're talking dozens and dozens of people hours here," Lee says. "For the price of the software, it's no contest."

While this may seem like a rather convincing list of reasons why a small business should use accounting software, there is an equally compelling reason why a business should not use it.

"The problem with any of the accounting packages is the GIGO principle—garbage in, garbage out," warns Tharan Lanier, president of Tharan J. Lanier, CPA in Saratoga, Calif. In other words, without a working knowledge of common accounting practices and terminology, the use of accounting software can lead to incorrect records and erroneous income and tax information. These are the type of mistakes that can lead to things such as bankruptcy and going-out-of-business sales. Therefore, it's absolutely necessary for a small business to do its homework before making the decision to switch accounting methods.

■ 'A' Is For Accountant

The most important point to realize before deciding whether to computerize the financial records of your small business is that no software package can replace a knowledgeable accountant.

"Small-business accounting programs should augment the accountant's job, but they certainly shouldn't replace it," BestWare's Lee says. "There's much value in having a good accountant. A knowledgeable accountant could be the difference between a successful business and a not-so-successful business."

Business accounting clearly involves more than just adding and subtracting numbers, although that is a large part of it. Think of accounting software as a very high-end calculator. A business owner enters one set of numbers into the calculator and, after a series of calculations, receives in response a different set of numbers. These numbers will undoubtedly impact the life of the business. The type of impact these numbers have, however, depends upon their accuracy and how the owner interprets their significance. This is where the accountant enters the picture.

An accountant can examine a business' financial records on a monthly basis to check for minor errors and make correcting journal entries. Even the most meticulous business owner is liable to commit a few accounting mistakes amid the hustle and bustle of a typical business day. Having an accountant verify a business' financial records not only gives the owner an accurate picture of the company's financial status, but it also makes it easier for a business to obtain a loan at a bank or another financial institution. Creditable financial institutions like to protect their investments by receiving an accountant's seal of approval before writing a check.

A trained and licensed accountant also can analyze the financial records of a small business and then offer the sound financial advice that no accounting program would ever be able to provide. Indeed, many accountants now spend more time doing financial consulting than entering credits and debits into a four-column ledger.

"I'm seeing a real shift in my industry, and that shift is accommodating people when they get a software package," says Lanier, who admits he was nervous when he first heard one of his customers had decided to use an accounting software package. "After a short time, I realized I can do a better job for these people because they're becoming informed consumers of accounting services."

■ Evaluate Your Business

A substantial number of small businesses have taken that step toward becoming informed consumers and now use some type of accounting software in their daily business operations. Before notifying your accountant that you also plan to jump on the bandwagon, you need to determine how well your business will accommodate computerized accounting practices. There are four factors a small-business owner should consider:

1. Assess the amount of in-house accounting expertise currently available to your business. According to Lanier, small businesses fall into three categories of accounting needs. The first type of business has absolutely no accounting expertise at all. "They may use a computer for word processing and things like that," he says, "but they don't even want to mess with accounting software." This type of business should continue to use an accountant for all its accounting needs.

The second type of business is a small business that has some general accounting knowledge and may have a full- or part-time bookkeeper but doesn't have a certified accountant on salary. These businesses do a lot of the data entry and calculations themselves but then depend upon an accountant to reconcile their books, prepare financial statements, and provide financial consulting. These businesses constitute a large portion of the small-business accounting software market.

The third type of business has a paid accountant in-house. These businesses probably

Product Roundup

The truth is, most of the small-business accounting packages on the market today offer very similar services. "There's a level up to about $250, where most of the products do the same thing, and it becomes a matter of taste, really," says Tharan Lanier, president of Tharan J. Lanier, CPA in Saratoga, Calif. The following product listing explains some of the minor differences that distinguish the programs.

QuickBooks Pro
(800) 624-8742
(415) 944-6000
Street price: $189
Hard drive space: 21MB to 37MB

Distinguishing characteristics: The QuickBooks series are the most popular small-business accounting programs. The EasyStep Interview guides new users gently through the setup procedure. QuickBooks includes both a *Netscape Navigator* Internet tool for easy connection to the QuickBooks Small Business Online site on the World Wide Web and a small-business CD-ROM reference library.

DacEasy Accounting and Payroll 95
(800) 322-3279
(214) 248-0305
Street price: $130
Hard drive space: 11MB to 17MB

Distinguishing characteristics: The DacEasy Self-Paced Seminar takes users through the entire process of putting financial records online. DacEasy includes the 1996 tax tables to accompany the comprehensive payroll module.

Peachtree Accounting For Windows
(800) 228-0068
(770) 564-5800
Street price: $120
Hard drive space: 15MB to 20MB

Distinguishing characteristics: Peachtree is a network-ready accounting package, aimed at multiuser business environments where a number of different people need access to the same information. An included CD-ROM offers free software that will complement your accounting program with connectivity and troubleshooting tools. Peachtree also provides 85 support centers throughout the United States.

MYOB Accounting With Payroll
(800) 322-6962
(201) 586-2200
Street price: $130
Hard drive space: 10MB

Distinguishing characteristics: MYOB Accounting buyers receive a video that walks them through the setup procedure. MYOB also has 220 certified consultants, trained specially by MYOB, who direct the transition to automated accounting, train employees, and offer consulting advice to the business. MYOB also includes a cardfile and a report customizer that offers 100 options for preparing financial statements and reports.

Aptitude
(800) 460-7675
(713) 888-0278
Direct retail price: $99
Hard drive space: 35MB

Distinguishing characteristics: The original package doesn't offer all the features the other programs do, but it can be upgraded quickly and efficiently as your business grows. The interface is less sharp than some of the other packages. Aptitude offers 60 days of free technical support as opposed to the usual 30 offered by most manufacturers of accounting software. The makers of Aptitude based the database on *Microsoft Access*, which allows for easy transfer of data between the two applications.

BusinessWorks For Windows
(800) 854-3415
(714) 753-1222
Street price: starting at $395
Hard drive space: minimum 25MB

Distinguishing characteristics: BusinessWorks is a high-end accounting application, designed for large businesses with demanding accounting needs. Its database can handle a virtually unlimited number of customers, vendors, and employees, restricted only by the size of your storage device, so it will keep up with your growth. It is substantially more expensive than the other products.

use a high-end accounting application, such as *BusinessWorks*, and may have even created their own proprietary accounting software. When this type of business uses an accounting service, it is almost exclusively for external auditing or consulting purposes.

If your business falls into the second category, you're a prime candidate for small-business accounting software. If you fall into the first or third category, you should probably pursue another accounting avenue. Of course, all businesses should consult with their accountant to determine the most profitable option.

Don't try to use a personal accounting application, such as *Quicken* or *Microsoft Money*, for your business needs. Some entrepreneurs try to eliminate an initial expense by twisting their personal accounting program to suit their business needs. But personal accounting applications weren't designed to handle even the most fundamental business requirements. After the business has grown a little, it will exceed the capabilities of the personal accounting application. Some low-end small-business accounting applications can be purchased for less than $100. Either spend a little extra money and purchase a low-end small-business application or use a paper ledger to keep track of your initial financial records.

2. Determine whether your business is primarily product- or service-oriented. A business that sells products will require an accounting application that can handle a large and continually changing inventory. A business that markets services, on the other hand, is more likely to need a stable billing system that can keep track of regular customers.

3. Evaluate the payroll requirements. Some businesses do their own bookkeeping but prefer to let an accountant take care of payroll duties, so not all small-business applications include a payroll module. Make sure the accounting software application you purchase will meet your current and future payroll needs.

4. Take into consideration any circumstances that are unique to your business. The small-business market covers a wide array of businesses, with everything from hair salons and butcher shops to pet stores and car dealers. Software manufacturers try to create products that will meet the needs of most of these companies, but there are bound to be a few businesses that have special considerations. Consult with your accountant to determine any special needs you have and which companies will help fulfill those needs. (See the "Product Roundup" sidebar in this article for a brief synopsis of a few of the most popular small-business accounting programs.)

Once you have selected a product, tell your accountant right away. You need to find a product with which you are comfortable because you'll be using it on a daily basis. But you also need to make sure your accountant is comfortable working with the application because your accountant will use it to reconcile your records and figure your taxes.

"If you go into your accountant's office, and the guy turns kind of gray," Lanier says, "it might be a good idea to look around for someone else because he's frightened of (accounting software). And there's a lot of accountants out there who are like this—who have been in the business 20 years, and they're set in their ways."

If your accountant doesn't agree with your decision, check with other accountants. It's important that you find an accounting method—whether it's the traditional method

Users'

Kevin Holmgren, proprietor
Haute Stick Lacrosse
Lacrosse gear and wear
Mission Viejo, CA
Accounting software: MYOB

Greatest advantage of using accounting software. One of the coolest things is when you open up the application, a to-do list pops up and tells you how receivables are aging. It's easy to get an idea of what's supposed to be coming in and what's going out.

Greatest disadvantage of using accounting software. Being a small business, we don't have the ability to take advantage of some of the input methods, such as the bar-code scanner.

Advice for other businesses considering an upgrade to small-business accounting software. It's necessary to get a small-business accounting package that can grow with you.

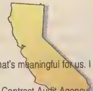
Mike Theisman, vice president
Florissant Auto Paint
Automotive paint store
Florissant, MO
Accounting software: DacEasy

Advantage. The payroll module is the main feature I use. It gives quick and accurate computation. I can do it all myself rather than have an accountant or payroll service do it, and for five to 10 employees like we're dealing with, it's not worth having somebody else do it.

Disadvantage. Some features overlap with other accounting systems we use, such as the billing feature, so we don't use those features.

How has the roll of your accountant changed since you purchased the product? Basically, he reviews what I prepare rather than him preparing anything. It's actually saved us dollars that way.

Patty Bellomo, vice president of administration and finance
Paranetics Technology Inc.
Parachute manufacturer
South El Monte, CA
Accounting software: Aptitude



Advantage. I like being able to extract the data in a way that's meaningful for us. I can have the information as detailed as I want.

Disadvantages. We get audited regularly by the Defense Contract Audit Agency, so I have a lot of people looking over my shoulder. That can be bad because the DCAA may want our records set up a certain way that's contrary to how our CPA would set it up for us.

Advice. I would do my homework and see what's out there and really try to find a package that's going to fit the company's needs.

or the computerized method—that will most benefit your business. The life of your business may depend upon it.

■ The Next Step

The physical installation of small-business accounting software may occupy an hour of your time . . . if you take a few coffee breaks and a short nap during the process. Simply slide half a dozen diskettes or a single CD-ROM into the computer, press ENTER a few times, type in your registration number, and you're done. The ordeal of completely digitizing your financial records, on the other hand, may take weeks.

But don't let that scare you. Small-business accounting programs were designed for ease of use, with intuitive point-and-click interfaces and comprehensive manuals. Some of the software companies also have contracts with consultants whose job it is to assist small businesses in transferring financial information from the paper ledgers to the computers. These consultants know the intricacies of the software packages and are prepared to answer almost any question and address almost any situation that arises during the tedious installation process. In addition to helping preserve the integrity of the transferred records, they also will train employees to use the new accounting system.

Evaluate your own accounting expertise and the accounting skills of others in the business to determine whether you need to hire a consultant to assist with the installation and training. Getting the job done thoroughly and accurately is the most important consideration. The cost of hiring a certified consultant averages close to $1,000, Lee says, but it can be justified easily by the time, aggravation, and money that would have been spent trying to rectify a flawed installation. If you install the application yourself, have the figures double-checked by your accountant before you put the program into daily use. Consult your accountant for advice on the most efficient installation option for your business.

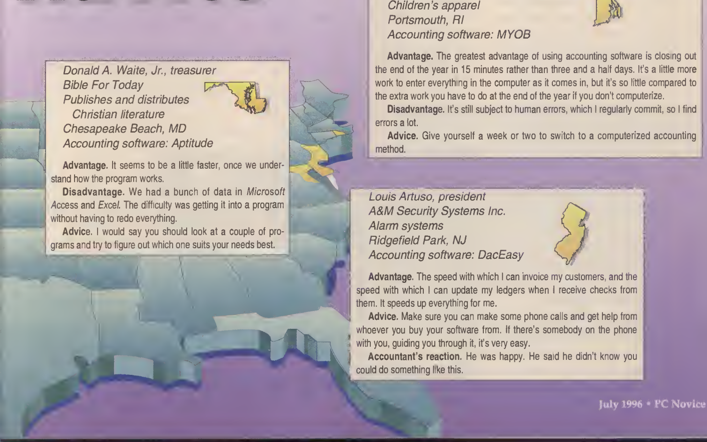
After the computerized accounting program has been fully integrated into the daily business routine, meet with your accountant to decide the best course of action for keeping efficient, accurate financial records. Lanier describes his typical relationship with a business that uses accounting software: "At the end of the month, I come in and clean up the bank reconciliation, make the adjusting journal entries for depreciation and for the various accruals of interest, and, if they have a pension plan or anything like that, I make sure all those things are in." Every small business has its own needs, though, so try to determine an accounting schedule that will accommodate your concerns.

■ In The End

Underlying everything that has been discussed is the need to find an efficient accounting method that not only conforms to your business demands but also contributes to the profitability of your business. By combining a solid accounting package with a good accountant, small-business owners can stay aware of what's going on in their businesses on a day-by-day basis, Lanier says. "They have real-time information to manage with, and they also have good financial statements." That's a pair of factors that will keep your business in the black, which is exactly what proper accounting should do. ●

by Jeff Dodd

Advice



Jonna Reed, president
Kindergear
Children's apparel
Portsmouth, RI
Accounting software: MYOB

Advantage. The greatest advantage of using accounting software is closing out the end of the year in 15 minutes rather than three and a half days. It's a little more work to enter everything in the computer as it comes in, but it's so little compared to the extra work you have to do at the end of the year if you don't computerize.

Disadvantage. It's still subject to human errors, which I regularly commit, so I find errors a lot.

Advice. Give yourself a week or two to switch to a computerized accounting method.

Donald A. Waite, Jr., treasurer
Bible For Today
Publishes and distributes
Christian literature
Chesapeake Beach, MD
Accounting software: Aptitude

Advantage. It seems to be a little faster, once we understand how the program works.

Disadvantage. We had a bunch of data in *Microsoft Access* and *Excel*. The difficulty was getting it into a program without having to redo everything.

Advice. I would say you should look at a couple of programs and try to figure out which one suits your needs best.

Louis Artuso, president
A&M Security Systems Inc.
Alarm systems
Ridgefield Park, NJ
Accounting software: DacEasy

Advantage. The speed with which I can invoice my customers, and the speed with which I can update my ledgers when I receive checks from them. It speeds up everything for me.

Advice. Make sure you can make some phone calls and get help from whoever you buy your software from. If there's somebody on the phone with you, guiding you through it, it's very easy.

Accountant's reaction. He was happy. He said he didn't know you could do something like this.

Microsoft Excel 5.0

Using Templates, Part I

If you've ever sewn a garment, completed a paint-by-number kit, or assembled a model airplane, you understand the important roles patterns can play. Patterns offer guidance and ensure that finished products look fairly close to what you'd envisioned.

Patterns are also useful when you work with certain computer documents. Called **templates**, these patterns help you quickly create similar-looking documents by saving formatting codes and other pertinent information. You simply insert the correct data into the document and let the computer do the rest.

What's An Excel Template?

In *Microsoft Excel* 5.0, a template is a pattern workbook that you use to create other workbooks of the same type. This workbook can contain formatting codes for your data, as well as graphics, formulas, and macros.

When you open a template, Excel creates a copy of the template and opens it for you to work on and save. The original template is left unaltered and ready for you to use again.

For example, if you're in charge of the national sales force for your company, you probably create monthly sales reports that show total sales income, sales by region, and the commissions received by your salespeople. Rather than spending hours creating and formatting this spreadsheet every month, you can create a template. Then, when you need to provide the CEO with the sales figures, you simply open the template and insert the updated data.

Creating The Pattern

Most of the template-creating magic comes when you're ready to save a document. Before you do this, you first must create the workbook you want to use as your pattern. You do this just as you'd create any other Excel workbook by inserting all formatting codes, graphics, formulas, and macros. You then save the workbook as a template. Any workbooks you currently have on file can be saved in template format.

To save a workbook as a template, open or create the workbook. Then choose the Save As command from the File menu to open the Save As dialog box. In the Save File As Type section, choose Template from the pull-down list. After selecting the drive and directory in which you want the template saved, click OK. The workbook is now a template.

When Excel saves a workbook as a template, the program gives the file a special identifier. Most Excel workbooks have an .XLS following a file's name. Template workbooks, however, use the .XLT file name extension.

Putting It To Use

To create a new workbook based on a template workbook, open the template by choosing Open from the File menu. Then choose the name of the template you want to use. As we mentioned before, Excel makes a copy of the template for you to work with and save, leaving the original template intact and ready to be used next time.

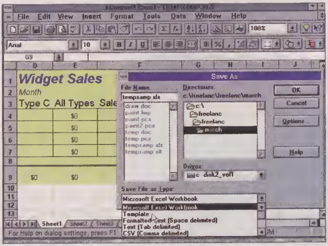
After you enter new data into the template, you can save the workbook for your records. You do so just as you'd save any other workbook in Excel. From the File menu, choose Save to open the Save As dialog box. Using the File Name, Directories, and Drives fields, type the file's name and choose the drive and directory in which you want the file saved. Note that the Save File As Type box says "Microsoft Excel Workbook." This means the document will be saved as a regular workbook, not a template.

Editing templates. Once you create your template, you're not stuck with its formatting or data. Using basic editing commands, you easily can add information, change cell appearance, insert or delete columns and rows, and update graphics as the need arises.

To edit your template, open it just as you would any other file. Then make all the necessary changes. When you save the file, save it as a template, not as a document. To ensure that you don't improperly save it, make sure the Save File As Type box says "Template" rather than "Microsoft Excel Workbook."

Now that you know how to create, save, and edit templates, you're ready to move to the next level. If you've been unhappy with the default settings for your Excel workbooks, you'll be pleased to learn that you can change them with Excel's autotemplates. Join us next month to learn the basics of this handy feature. ●

by Lori Beckmann Johnson



Widget Sales
Month
Type C All Types Sale
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File Name: tempsamp.xls
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march

Drives: c: disk2_vol1

Save File as Type: Microsoft Excel Workbook
Microsoft Excel Workbook
Template
Formatted Text (Space delimited)
Text (Tab delimited)
CSV (Comma delimited)

For Help on dialog settings, press F1

To save a workbook as a template, make sure the Save File As Type section of the Save As dialog box has "Template" selected, instead of "Microsoft Excel Workbook."

Quattro Pro 6.0

Customizing Notebook Settings

If you're tired of manually changing settings every time you open the same notebook, you'll appreciate *Quattro Pro*'s customization tools. This month, we show you how to change the most commonly customized settings.

Setting View Options

There may be times when you don't want to see tabs displayed on the pages of your notebook. To enable or disable the display of tabs in a notebook:

1. Open the notebook you want to customize.
2. Click the Property button on Quattro Pro's button bar, then select Active Notebook to open the Active Notebook properties sheet.
3. Click on the Display radio button.
4. In the Display box, click the Page Tabs check box to (de)activate this feature.
5. Click OK to save your work.

The Display box also lets you hide your vertical and horizontal scrollbars from view. To do so with any notebook, repeat steps one through three above. Then, in the Display box, click the Vertical Scroll Bar or Horizontal Scroll Bar check boxes to display or hide scroll bars. Click OK to save your work.

Choosing A Zoom Factor

If the worksheets in your notebook aren't the optimum size for your viewing purposes, you may be forced to zoom in or out to make viewing more comfortable every time you open a notebook. Quattro Pro, however, can be customized to zoom to a specified level automatically every time the file is opened. To specify a zoom level in the current notebook:

1. Select Zoom from the View menu, select a setting, then click OK to see your setting applied. In this way, retry different zoom factors until you find the one you like the most.
2. Click the Property button on Quattro Pro's button bar, then select Active Notebook.
3. Click Zoom Factor.
4. In the Zoom Factor box, make your selection from the list of zoom percentages. You also can customize Quattro Pro to zoom to any selected (highlighted) area in a worksheet with the Selection radio button. If the percentage you want to use is not displayed in the list, you can click the Custom radio button to specify your own setting.
5. Click OK to save your work.

Changing Colors

If you use colors in the cells of your notebooks, you can add or change them through the Palette. To edit the Palette in the current notebook:

1. Click the Property button, then select Active Notebook.
2. Click Palette, then click a color from those listed. If you want to create a custom color, proceed to the next step. Otherwise, click OK to save your work.
3. If you want to create a custom color, click the gray square on your current palette, then click Edit Color.
4. You now have several choices for setting a color. If you see the color you want, click it, and click OK to save the setting. If you still need to create a color, you can use the three scroll bars at the bottom of the box. Just drag the sliders on the color scales until the sample color in the right corner is the one you want, then click OK.

If you know the numeric HSB, RGB, or CMY values of the color you want, enter them in the appropriate text box(es), then click OK. HSB (hue, saturation, and brightness) controls the intensity of a color and lets you decide how much gray will be present. RGB (red, green, blue) lets you mix different amounts of these primary colors to create other colors. CMY (cyan, magenta, yellow) works similarly to RGB.

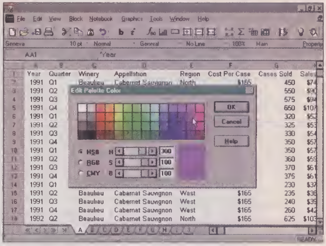
Designating Passwords

If you share a computer with others, you may want to password protect your notebooks. To set a password for the current notebook:

1. Click the Property button, then select Active Notebook.
2. Click Password Level, then click on each of the four radio buttons, reading the description of each level as you go.
3. Choose a level that suits your needs, enter a password if prompted to do so, then click OK.

Most of us look for ways to cut corners once we get comfortable with using Quattro Pro. By customizing these and other default settings for notebooks, you can save yourself time and hassle by reducing redundant work. ●

by Robert Mullen



AA1 'Year

	Year	Quarter	Winery	Appellation	Region	Cost Per Case	Cases Sold	Sale
1	Year	Quarter	Winery	Appellation	Region	Cost Per Case	Cases Sold	Sale
2	1991	Q1	Beaulieu	Cabernet Sauvignon	North	$165	450	$74
3	1991	Q2					550	$90
4	1991	Q3					575	$94
5	1991	Q4					650	$107
6	1991	Q1					320	$52
7	1991	Q2					325	$53
8	1991	Q3					330	$54
9	1991	Q4					350	$57
10	1991	Q1					350	$57
11	1991	Q2					360	$59
12	1991	Q3					370	$61
13	1991	Q4					375	$61
14	1991	Q1					230	$37
15	1991	Q2	Beaulieu	Cabernet Sauvignon	West	$165	235	$36
16	1991	Q3	Beaulieu	Cabernet Sauvignon	West	$165	240	$39
17	1991	Q4	Beaulieu	Cabernet Sauvignon	West	$165	260	$42
18	1992	Q2	Beaulieu	Cabernet Sauvignon	North	$165	625	$103

Edit Palette Color

● HSB H 300
○ RGB S 100
○ CMY B 100

OK
Cancel
Help

***Quattro Pro* lets you select from the installed pallete colors, such as this shade of fuschia, or create your own with the scrollbars and the HSB, RGB, and CMY radio buttons.**

Quicken Deluxe 5.0

Using The Deluxe Gateway

5.0 FOR WIN
PERSONAL FINANCE

If companies slap the word "Deluxe" or "Special Edition" onto a product, consumers rightfully expect something extra. They want unique features, and they want the extra money they're spending put to good use. *Quicken Deluxe* 5.0 attempts to live up to its "deluxe" billing by offering several features in the Deluxe Gateway that are aimed at helping you better track your investments and assets in tandem with the program's general accounting functions.

To reach the Deluxe Gateway, click its icon in Program Manager. You'll gain access to a variety of specialized Quicken features, including a home inventory program, financial advice, and advice for using Quicken. You can move from the Gateway into your Quicken checkbook register by clicking the yellow dollar sign in the middle of the screen. Of all the features here, we found the Home Inventory program to be the most valuable.

Take Stock Of Your Stuff

To enter the Home Inventory program, click its icon in the Gateway window. The program lets you travel room by room through your home, listing your belongings and their values, which is extremely valuable if you ever need to make an insurance claim.

The Home Inventory program is fairly easy to use. Select a room in the View By Location box, then select an asset type in the Item Category column. Depending upon the item category you've chosen, the program will display a list of commonly owned items on the right side of the window. Double-click an item, and Quicken will list it among your home inventory, including estimated replacement and resale values. You can edit the item's name (which is helpful for distinguishing between similar items) or its values by clicking the appropriate box.

Entering additional items introduces you to one of the program's strangest quirks. You logically would assume that clicking the Record button saves the information you've entered about an item and lets you enter another item. The Record button nearly always remains dimmed, though, which means you can't use it. If you run into this problem, you can move to the next blank line by double-clicking another item (which automatically skips you to a new line), by clicking the next blank line, or by pressing ENTER twice.

Each time you change rooms, you'll have a blank inventory database with which to work. At any time, you can enter detailed information about particular items. Highlight the item about which you want more information and select the View menu's Detail View command. In the Detail View window, you can list the item's serial number, make, model, and purchase place, date, and price. You can specify what insurance policy, if any, covers the item and enter some notes about the product. Click the Prev Item or Next Item buttons to stay in the Detail View window and move between items in your current room list. Click the Return To List View button to enter more items.

We suggest using the Detail View window features only for your most valuable items, at least initially, because entering such detailed information is time-consuming. Entering all of your possessions should take one to two hours; if you enter detailed information for the majority of your items, you'll spend several hours at the computer.

Now enter your insurance policy information to perform a comparison of your coverages and possessions. Click Policies and double-click a policy category to enter detailed information, such as your policy's location and value.

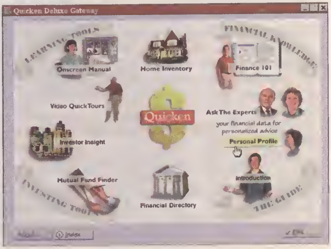
After you've entered all of the above information, the Home Inventory program can generate a report and help you determine whether you have enough insurance. Open the Reports menu and select either Insurance Coverage Summary or Insurance Coverage Detail. Quicken lists all your entered possessions, comparing their combined replacement cost to your insurance coverage.

Ask For Help

Two other helpful Gateway features are the Finance 101 icon, which provides general financial advice and information through a combination of video segments and written information, and the Ask The Experts icon, which provides video answers to common financial questions based upon information you've entered in the Personal Profile section. Both features are extremely easy to use. While expert investors can skip these features, most people will learn something new about finances.

The other portions of the Gateway provide an overview of and help with using Quicken and its features. These areas are best accessed as you need specific information. ●

by Kyle Schurman



The Deluxe Gateway provides access to several of *Quicken's* add-on features.

WordPerfect For DOS 6.0

Text Styles, Part 1

Many *WordPerfect* features save time by eliminating repetitive tasks, such as applying identical font attributes to different portions of a document. For example, if you want all headings to be in 24-point type with bold and underline attributes, it's more convenient to create one heading and copy its attributes than it is to repeat the steps involved for each heading.

WordPerfect's Style feature lets you apply a specific text style to different parts of your documents without re-creating the style each time you want to use it. Some styles, called System Styles, come with the program; you also can add custom styles that meet your needs. Once created, text styles can be edited, copied, or deleted.

This article begins a two-part series covering the basic steps of creating and applying a text style. Next month's tutorial will describe working with styles in more detail.

Using The Style Library

To apply an existing style from the style library, place the cursor within the paragraph you want to work with or highlight (block) the text. Then choose Style from the Layout menu or press ALT-F8 to display the Style List dialog box. It contains a list of styles in WordPerfect's library and has menu items on the bottom for creating and working with styles.

To make a selection, scroll through the list and highlight the desired style; click Select, or press 1 or S, to apply the style to the selected text. Style codes will be inserted into your document to indicate the style and where it starts and stops. The affected text will be changed to reflect the new formatting codes.

Creating Text Styles

To create text styles, block the text or position your cursor within the paragraph you are working with. This text can contain formatting codes from which you want to create a style, or the text can be unformatted and something to which you want to apply a style. Either way, press ALT-F8 to display the Style List dialog box

Click Create, or press 2 or C, to open the Create Style dialog box. Type in a name for the style you are creating. Each name should be unique to prevent the accidental overwriting of an existing style.

Choose a style type to describe the style you are creating. The **Paragraph Style** is for the paragraph containing your cursor or the paragraph(s) you have blocked and is particularly useful for headings and paragraphs. **Character Style** is for blocked text or text you are about to type and is used for words or phrases. **Open Style** will affect all text from the cursor location to the end of the document.

If you choose Paragraph Style or Character Style, you can create a style from the codes in the paragraph or character containing the cursor by selecting Create From Current Paragraph or Create From Current Character. If you don't select these options, you'll need to enter all of your style codes.

After making your selections, click OK to display the Edit Style dialog box. The style name and style type will be displayed, as well as a field into which you can enter a style description. You can enter your style codes in field 4/Style Contents by pressing 4 or clicking in that field and then entering your codes in the contents box. If you previously chose Create From Current Paragraph or Create From Current Character, the codes from your document will be inserted into the contents box, and you can edit them from there.

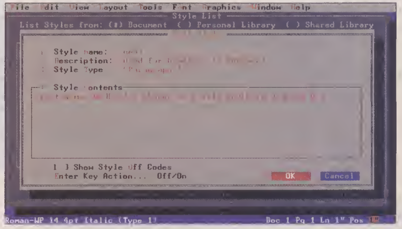
Codes are entered just as they would be if you were formatting a regular document. You can press function keys, such as F8 to underline, or key combinations, such as SHIFT-F8, to make selections for justification, line spacing, tabs, margins, and page numbering. Selections also can be made from the main menu at the top of the screen, such as using the Font menu to assign text attributes or size.

While you are entering your style codes, pressing ALT-F8 lets you base your style on an existing one. When existing styles are listed, highlight a style and click OK. The codes will be inserted into the Style Contents box.

When you have finished entering style codes, press F7 to return to the Edit Style dialog box. When your editing is complete, click OK. Your style has been created and added to your style library; it now can be applied to other text in your documents.

We'll describe several other options you can use when creating styles in our next issue. ●

by Diane Kaye Walkowiak


File Edit View Layout Tools Font Graphics Window Help
Style List
List Styles from: (•) Document ( ) Personal Library ( ) Shared Library
Style Name:
Description:
Style Type
Style Contents
[ ] Show Style Off Codes
Enter Key Action... Off/On
OK
Cancel
Roman-WP 14.4pt Italic (Type 1)
Doc 1 Pg 1 Ln 1" Pos 1"

The Style options in *WordPerfect for DOS* let you create text styles that you can use to quickly format your documents.

PageMaker 5.0

Control Palette

5.0 FOR WIN

DESKTOP PUBLISHING

The tutorial in March taught you that although *PageMaker* is not an illustration program, you still can make very simple graphics and manipulate them in a variety of ways. But that's not all there is to know. PageMaker also lets you manipulate objects either manually or with its Control Palette.

The Control Palette lets you work with objects on-screen without requiring you to walk through the toolbox and dialog boxes. You also can do things more precisely because the Palette shows you exact numerical information about the objects you're working on.

To open the Control Palette, choose the Window menu's Control Palette command. The Palette appears at the bottom of the screen. Move it by dragging its left edge, and close it by clicking on its upper-left corner.

At the leftmost is the Apply button, which shows the kind of object or tool selected and is used to apply modifications to objects. Next to the Apply button is the Proxy, which shows an object's **reference point** (the point where PageMaker applies changes to the object). This may be a handle or center point.

To grasp the concept of the Proxy, try this: place a graphic on a PageMaker file. The Control Palette will show the default reference point, which is the graphic's upper-left corner. As you move the graphic, look at the Control Palette's *X* and *Y* coordinates. The numbers they show are the positions of the graphic's upper-left corner relative to the rulers' zero point. Drag one of the graphic's handles. Notice that the Proxy automatically shows the reference point that corresponds to the handle you dragged.

■ Rotating Objects

When you rotate objects with the Control Palette, the object rotates around the Proxy's reference point. Simply select the object and enter a value in the box beside the rotate icon. The arrow cursor turns into an I-beam when it reaches the box. As you enter a value, remember that positive numbers produce a counterclockwise rotation; negative numbers, a clockwise rotation. Then click Apply.

You also can rotate a graphic or text block without using the Control Palette. To do so, select the object and click the Reflection tool in the toolbox. The arrow changes into a starburst. Position the starburst on a fixed point, which may be the object's handle or center point, and click. The fixed point you select automatically becomes the Proxy's reference point. Drag the starburst away from the fixed point and in the desired direction. The farther the starburst is from the fixed point, the more controlled the rotation. To rotate in 45-degree intervals from the starting point, press the SHIFT key as you drag.

As you rotate manually, the Control Palette displays the angle of rotation in the box beside the rotate icon. A clockwise rotation produces smaller numbers or narrower angles; a counterclockwise rotation, bigger numbers or wider angles.

■ Skewing & Reflecting

Unlike rotations, skewing and reflecting can be done only with the Control Palette. Select an object first. Then to reflect, click on the horizontal- or vertical-reflecting button in the Palette. PageMaker immediately reflects objects, so there is no need to click Apply. Reflecting is useful in making imported graphics, such as clip art, face a certain side of a page.

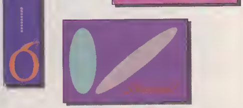
To skew, enter a value for the skew angle in the box beside the Skew icon. Values must range from +85 to -85 degrees to be valid. No matter what the reference point is, positive numbers move the object's top edge to the right; negative numbers, to the left. Click Apply. Skewing is useful in creating shadows and simulating a three-dimensional look for boxes.

Use the Edit menu's Undo command to remove *only* your most recent transformation. To remove *all* transformations applied to an object, select the Element menu's Remove Transformations command, which applies to all objects except a PageMaker line.

Be creative . . . Rotate squares to turn them into diamonds. Rotate ovals in varying angles and arrange them around a solid circle to create a flower. Create an abstract graphic with rotated, skewed, or reflected circles, ovals, rectangles, and squares. Skew a copy of a headline and place the transformed copy behind the original, then color the copy gray to create a shadow. Use your imagination!

. . . but don't overdo it. Remember that PageMaker is primarily a page layout program, which is why the graphics it creates are very plain. Still, you can use transformed shapes or letters to draw attention to headlines, readouts, or sidebars. In text-heavy layouts, however, avoid using too many transformations on text blocks and individual letters. Unnecessary transformations in too many places result in distorted letters and a confusing, unattractive layout. ●

by Annepely P. Dakay



You can transform dull graphics by using Control Palette's reflecting, rotating, and skewing tools.

Microsoft Word 6.0

Merging Form Letters & Data Sources

In our April Quick Study, we covered *Microsoft Word*'s Mail Merge Helper, which leads you through the process of creating a data source for a mail merge. This month, we'll show you how to merge a form letter with names and addresses in a personal address book.

On Your Mark . . .

To begin the process, choose Mail Merge from the Tools menu. In the resulting Mail Merge Helper dialog box, click Create, then choose Form Letters from the drop-down list. Word asks whether you'll be using the current document window or a new one. If you already have a form letter in place or have to create one, select Active Window. If you don't want to use the document in the active window, click New Main Document.

Word returns to the Mail Merge Helper dialog box and asks you to specify a data source for the project. Click Get Data. If you have a data source, select Open Data Source from the drop-down list; if you have to create one, choose Create Data Source.

Get Set . . .

If you're creating a data source, you can use Word's ready-made field names and add, delete, and rearrange them as needed. For this tutorial, delete the Job Title, Address2, Country, PostalCode, and Home Phone fields. Click the cursor in the Field Name box to add FaxPhone and ZIP field names. Click OK. Save the data source file as "FormData."

To add records to this file, click Edit Data Source and complete a record for each recipient. When you are finished, click OK. Word returns you to the active document, adding a Mail Merge toolbar below the Formatting toolbar.

To create a form letter using fields from the FormData address book:

1. Enter the date by choosing Date and Time from the Insert menu and selecting a format. Click the box marked Insert As Field. This directs Word to update this field automatically whenever you print.

2. On the Mail Merge toolbar, click Insert Merge Field for a drop-down list of Data Source Fields. Choose Title, which appears on-screen at the cursor insertion point framed in chevrons as <<Title>>. If Title appears as {MERGEFIELD Title}, it's because the Field Codes command has been turned on. To turn off this command, choose Options from the Tools menu, click the View tab, and deselect Field Codes in the Show list. Press the Spacebar to enter a space after <<Title>>.

3. Click Insert Merge Field, select FirstName, and press the Spacebar. Repeat the same process for the last name, then press ENTER. Insert the Company and Address1 field names on their own lines.

4. Place City, State, and ZIP field names on a single line, separated by spaces and with a comma after the City field. The line should appear as:

<<City>>, <<State>> <<Zip>>

5. Press ENTER twice to insert a blank line between the inside address and salutation.

6. Type **Dear** and press the Spacebar. Click Insert Merge Field, select Title, then press the Spacebar. Without pressing ENTER, click Insert Merge Field again and choose LastName. Enter a colon (:), then press ENTER twice. You now can type the body of your letter.

7. Type **Congratulations!** and press the Spacebar. Click Insert Merge Field, choose Company, press the Spacebar, and continue typing: **has been selected as this month's winner in our mega raffle drawing. Please come by the store on or before June 15, 1996 to claim your prize.** Press ENTER twice to begin a new paragraph.

8. Type **Sincerely** followed by a comma and press ENTER twice. Type your name, press ENTER, and type your job title.

9. Choose Save As from the File menu, name the file "FormLett," and click OK.

Merge!

You're now ready to merge your data source and form letter. To see an actual letter before printing it, click View Merged Data in the Mail Merge toolbar. Click Next Record or Previous Records to scroll through the records in your data source.

To print a particular record, choose Print from the File menu when the desired record displays on-screen. Click the toolbar's Merge To Printer button to print all records.

To print a range of records, click the Mail Merge button on the Mail Merge toolbar, then specify which records to print. ●

by Carol S. Holzberg, Ph.D.

Tips For A Successful Mail Merge

- If you create a data source using commas to delimit data source fields, *Word* will interpret source data containing commas as two fields rather than one. To ensure that Word recognizes Harrison, Berkeley & Jones as one company, place the company name in quotation marks ("Harrison, Berkeley & Jones").
- You can update a date field manually by right-clicking it with the mouse, then choosing Update Field from the in-context shortcut menu.
- The Query Options command (found under the Mail Merge command in the Tools menu) lets you sort data source records by as many as three data fields. Sort on ZIP code to save money on bulk mailings.

Word Pro 96

Drawing Tools

96 FOR WIN95

WORD PROCESSING

You've used the *Word Pro* word processor for a while, so you know how to import clip-art files and add them to your documents. But now you're designing letterhead for your new painting business—and you can't find suitable clip art. You could pay a designer hundreds of dollars to design a simple logo. Or, if you have even a shred of artistic talent, you could quickly create a logo with Word Pro's drawing tools.

We'll give you a foundation on the use of these tools as we walk you through the creation of a simple logo.

Creating A Logo

Since your new business is a painting service, we'll create a can of paint with the words "Johnson Painting" on it. Before we can begin drawing, though, we need to access Word Pro's drawing tools. To do this, choose Drawing from the Create menu. A graphics frame and groups of drawing tools will appear.

You can create any number of images with the eight basic drawing tools, which are located on the right side of the SmartIcon bar. (They're described in the box at the right.)

In the case of our logo, we'll combine two ovals, a rectangle, two arcs, and some text. It takes less than 10 minutes to create the figure.

First, we'll draw the basis of the paint can—a rectangle. Left-click the Rectangle SmartIcon. When held within the graphics frame, the pointer becomes a cross-hair. Left-click it where you'd like the upper-left corner of your rectangle to be located, then hold down the mouse button as you move the pointer. When you see a rectangle approximately the size and shape you'd like, release the button.

Now, let's round the top and the bottom of the can, creating two same-sized ovals. Left-click the Oval Smart-Icon, then left-click the left side of the rectangle and drag the pointer to the right side. Let go when you see an oval that looks right to you. Once you do this, you need to move the oval to the top of the rectangle, creating the opening of the can. Left-click the Pointer SmartIcon and select the oval. Drag it with the mouse until the top line of the rectangle becomes the oval's diameter.

To create the oval for the bottom of the can, choose Copy from the Edit menu, then choose Paste. A second oval will appear on top of the first. Left-click the oval and drag it until the bottom line of the rectangle becomes the oval's diameter.

Next, we'll draw the handle. Select the Arc SmartIcon. Starting from the left corner of the rectangle, left-click the mouse and drag it until you have an arc that looks like half a handle. Then left-click the right corner and drag the mouse until your arcs meet.

To add text to your drawing, left-click the Text SmartIcon. The on-screen pointer becomes an insertion point. Left-click it where you want to begin typing text and enter your message. You can change the typeface, size, and style of your text by using the ribbon at the bottom of your screen. We chose Zurich-Calligraphic type and 18-point size.

The basic drawing is now complete. Looks bland, doesn't it? To spice it up, we'll add some color and change line styles.

Adding color. You'll use InfoBoxes to change the color and style of your drawing's elements. For example, by selecting the rectangle and left-clicking the InfoBox SmartIcon, you open the Drawing Properties InfoBox. In this dialog box, you can select the color tab and alter line width and color, pattern style and color, and fill color.

To create our logo, we selected the rectangle and changed the line, fill, and pattern colors to yellow and the pattern to solid. We did the same with the two ovals. Then we chose both of the handle arcs and made the line style a little wider.

You can follow in our footsteps or experiment and create your own logo.

Placing drawings in documents. Once you've created your masterpiece, you'll probably want to use it whenever you send out a business document. To make selecting, copying, and pasting it easier, you'll want to **group** it together. (Grouping the graphic's elements lets you select all the elements with one click.) To do this, left-click the Select All Draw Objects SmartIcon on the Drawing toolbar. (It has a circle and a square on it.) Then left-click the Group SmartIcon, which has a grouped rectangle on it.

Now that you've created a simple drawing with Word Pro's drawing tools, you can save yourself time and headaches by creating your own simple graphics instead of searching through file after file of clip art. ●

by Lori Beckmann Johnson

The Eight Main Drawing Tools

SmartIcon	Used For:
╲	Drawing a line
〽	Drawing a polyline
⬠	Drawing a polygon
▭	Drawing a rectangle
▢	Drawing a rounded rectangle
⬭	Drawing an oval
◝	Drawing an arc
abc	Adding text to your drawing

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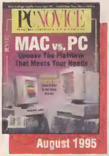

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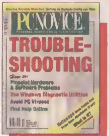

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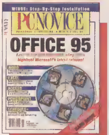

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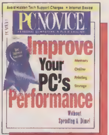

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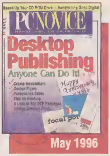

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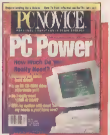

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How To Build A PC

"I think I would like to build my own computer."

Not so long ago, a statement like that from the average computer user might bring questioning stares from co-workers, worried glances from loved ones, and quips about flying pork. But talk of building a computer isn't always the delusional rantings of a PC user gone mad. It really is possible, even if you aren't a computer genius.

The ability to build a computer, once the territory of only hard-core computer enthusiasts, is now an option for more mainstream computer users. Improved technology, intense competition among manufacturers, and a growing population of computer users who aren't afraid of their machines have made building a computer a viable alternative to buying one off the shelf or through the mail. And when you come right down to it, who better to create your dream machine than the person who plans to use it?

In this article, the first of a two-part series on building your own PC, we discuss the reasons a normally sane person might endeavor to build a computer. We also take a look at what you'll need to build your masterpiece and how much it will cost you.

But . . . Why?

Anyone who has successfully built their own computer usually can rattle off a mile-long list of reasons why it is better to build your own than to buy one at the nearest computer-chain megastore. Then again, if you talk to somebody who has tried and failed, or who has never opened up their computer, they can probably argue a pretty convincing case for buying a manufactured model.

Most people decide to build their own computer mainly because they can put it together exactly as they want it, it is easier to repair, and it makes future upgrades a breeze, says Gregg Roseberry, manager of InfoLinc Computer Systems & Solutions in Lincoln, Neb. The store sells a wide range of computer components and builds custom computers for those who like the "build your own" concept but are afraid to take the plunge.

The real beauty of building your own computer is that you pick out exactly what you want, and you don't have to pay for features you don't need. For example, if you have no desire to join the millions of people herded onto the Internet each year by online companies and Internet service providers, you can leave out the modem. Or maybe you do want to visit the World

Wide Web, but you want to wait until the prices on the faster modems drop down a bit. When you build your own, you make the call.

Another reason you might opt for building your own machine is that when something breaks down, you are in a much better position to fix it. You put it all together and know where everything is. If you know the problem is with the video card, you can go directly to that card and decide what to do. If you still have a warranty on it, you probably can get it repaired, or get a new one, for free. If not, you can choose from the wide range of video cards available, spend as much as you see fit, then install the new one. You can complete the whole process within a day—if you can get a video card locally—and move on with your life.

According to Roseberry, repairs aren't always that simple when it comes to a computer manufactured by a name-brand company and sold off the shelf. For starters, you probably wouldn't dare try fixing it yourself, especially if it is still under warranty. Unfortunately, you probably can't simply take your machine back to the chain store where you bought it. Most often, the store will tell you to contact the manufacturer or the local shop "authorized" by that manufacturer to work on the PC.

Once you've finally found the right people, you may find out that the video card—along with most of your computer's other components—is proprietary, which means you must replace it with a part from the same company. That doesn't sound too bad until you find out that the card could cost quite a bit more than your average video card or is nearly impossible to find.

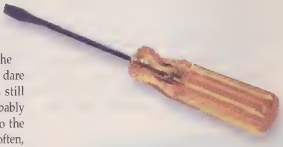
Even worse than that, many manufactured computers have components such as the video card built into the motherboard. The motherboard is the heart of the computer and houses the **central processing unit (CPU)**, which is the brain of the operation. If you have a motherboard with a dead video card, you may have to replace the whole package, and that isn't going to be cheap.

Whatever the final scenario, you could end up losing your computer for days, weeks, or even months as you ship it off to the manufacturer, your local shop waits for the right parts, or you start over with a new motherboard.

Out With The Old . . .

Another reason to build your own computer is that it will give you a great deal of flexibility when it comes time to upgrade in a few years. Yes, even with your souped-up ultra machine, you'll have to add memory or more disk space to keep up with the constantly evolving software out there.

Opting to build your own machine means that when something breaks down, you are in a much better position to fix it.



With your custom-built computer, upgrading is as simple as replacing a bad part. You take out the old stuff, put in the new stuff, and away you go.

Unfortunately, again, it isn't that simple with many manufactured machines. As with repairs, when you upgrade, you may face the high prices of proprietary parts and the liabilities of components built directly onto the motherboard.

According to Roseberry, the built-in components can do more than hinder an upgrade; they can make it nearly impossible if the computer maker hasn't created a way to work around these parts. In some situations, the best you can hope to do is salvage your drives and a few other items and start over.

"Their idea of an upgrade is usually 'buy a new computer,' " Roseberry says.

Dollars And Sense

In recent years, if users opted to build their own computers, they could expect to save some serious money. But with competition for the computer buyer's dollar increasing all the time, many new computer systems are selling at incredibly low prices.

Today's average first-time computer builder will probably spend about the same amount of money to build a computer as they would to buy a comparable one off the shelf. A custom-built computer from a store such as InfoLinc usually will cost about 10% more because of labor charges and added support.

We should point out that this nonscientific cost comparison comes from figuring in the cost of using good components from established manufacturers. If you buy a bunch of no-name brands from fly-by-night companies, you probably can build a pretty cheap machine and save some money. That's fine until things start to go bad, and you find these companies are no longer in operation. It can be pretty difficult to get a nonexistent company to honor its one-year warranty on your hard drive.

Our price comparison also hasn't accounted for the possibility that you might have some components already available to you. If you have an old keyboard or diskette drive that does everything you need it to do and is compatible with your new components, then use it. Or maybe you have a friend who wants to sell some components off her old machine. Maybe you can use them and save a few dollars.

Before giving our final plug for building your own computer, we'll mention one other option apart from doing it yourself or buying a PC off the shelf. You can always order a system from a mail-order company.

Buying a complete computer system through most mail-order companies is something of a cross between building your own and buying off the shelf. Most mail-order companies build their machines like a custom computer, with few proprietary parts. This makes them easy to repair and upgrade. The bad news is that if you aren't careful, you might find yourself repairing and upgrading often because you bought a computer loaded with low-quality parts. A cheap purchase price can cost you more money in the long run. If you do go with a mail-order package, stick with a company that will tell you exactly what goes into each machine. Make sure you are getting exactly what you want and read the fine print in those magazine ads.

Convinced Yet?

We believe that building your own computer can be the right way to go. Anyone who has some experience with installing computer hardware or working with electronics, and who has a healthy store of self-confidence, should be able to pull this off. Even so, it might be a good idea to find a friend or relative who knows their way around a motherboard *before* you get started.

If you're a little nervous about taking the lid off the computer you have now or the concepts of a hard drive and a diskette drive are still a little fuzzy, you might not be ready to tackle this. Don't feel bad; the big computer companies are still there for you.

Shopping Around

Once you choose to build, you face another set of decisions. The first involves determining what components you need and want in your machine and how much you are willing to spend for the whole package.

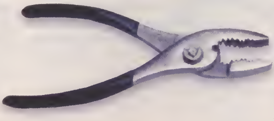
The best place to start your list is with a set of minimums. Set the bottom limits of what you will accept in terms of components and their performance. Then set a budget. As you begin to compare prices, you may decide that you can afford a larger hard drive or a better monitor, and you can make those adjustments before you buy.

Once you're ready to buy, you must decide whether to purchase your equipment from your local computer store or through a mail-order company. Both have advantages.

When you buy components from a local store, you will probably pay a higher price. In exchange for the extra money, however, you can expect more personal service and greater accountability should anything go wrong with the part. If your video card stops working a month after you install it, it's much easier to take it out and run it over to the local store than to send it off to a company halfway across the country. And it is almost always easier to get the results you want when you can talk to someone in person instead of on the phone.

The greatest advantage to buying from a mail-order company will be a lower price, and it can be a substantial savings. While dealing with a salesperson or customer service representative over the phone and through the mail can be a hassle, a reputable company will do its best to take care of any problems you encounter. The key to a successful mail-order experience is to ask around and find out who your friends and co-workers have had the best luck with, then ask plenty of questions—including the cost of shipping and handling—when you get ready to place your order. If the salespeople on the phone are rude or act as if you are taking too much of their time, take your business elsewhere. Wherever you decide to buy, make sure you know exactly what you are getting and beware of any company that has prices that look too good to be true.

Regardless of whether you choose a local store or mail order, try to buy the majority of your components (especially your motherboard, CPU, and memory) from the same company. This can help cut down on compatibility problems later. Some companies even will install the CPU and memory chips on the motherboard for you, which can save you some time and frustration. Also, buying most of your equipment from one place can save you shipping costs on mail orders, and it's easier to keep track of where to call if there is a problem.



Start your list of what components you need with a set of minimums. Set the bottom limits of what you will accept in terms of components and their performance. Then set a budget.

We decided to use a mail-order company we selected from the advertising section of our sister publication, *PC Today*. We picked Computer Craft Inc. in St. Petersburg, Fla. They carried a good selection, had very competitive prices, and the salesperson we talked to was very knowledgeable and courteous. They impressed us. We obtained all of the items listed below from Computer Craft Inc., unless otherwise noted.

The Basics

There are some components that you simply cannot build a computer without. We'll discuss the necessities first and the fun stuff later.

CPU and motherboard. We don't recommend skimping on these two items because if they fail, you're out of luck. Spend your money on quality, and you won't be sorry. For us, quality means buying an Intel Pentium CPU. Anything less than a Pentium will be obsolete before you even get your new system booted up.

Stick with an Intel-based motherboard as well to ensure quality and complete compatibility. We like the peripheral component interconnect (PCI) bus over the rest because it gives you the speed you need and full plug-and-play capabilities. While you should avoid a board that has too many built-in items, we like the ones with the integrated drive electronics (IDE) interface. Remember: You don't want to get stuck with a board with a built-in video or sound card. It might make your life a bit easier now, but you'll probably regret it in the future.

We opted for the Intel 100 megahertz (MHz) Pentium CPU on a Triton Pentium 75-133MHz PCI motherboard. The board includes an IDE interface, 256 kilobyte (KB) pipeline cache, fan, flash BIOS, three PCI slots, and four industry standard architecture (ISA) slots. There are faster CPU/motherboard pairs out there, but this unit seemed like a good price/speed combination for our needs. We always can upgrade down the road. The cost of the CPU and motherboard combination was $302.

Memory. You can't run a motherboard without random-access memory (RAM), and the more you have, the better. If you don't plan to run Windows 95 or much of the software that is coming out now, you probably can get by with only eight megabytes (MB) of RAM. However, we suggest at least 16MB.

RAM comes in the form of single in-line memory modules (SIMMs), which you can purchase in many different configurations. Your motherboard should have at least four slots for SIMMs, so if you want 16MB, you can buy four SIMMs with 4MB each, two with 8MB each, or even one with all 16MB. (Make sure your motherboard will run off a single SIMM; some require pairs.) When you buy your SIMMs, make sure they have the same number of contacts (usually 72) as your motherboard. Since you will probably want to add memory in the future, choose a configuration that leaves your options—and at least two slots—open. Also, most SIMMs come in speeds of 60 nanoseconds (ns), 70ns, or 80ns. The lower the number, the faster the SIMMs and the better your RAM performance.

We opted for a 16MB package at 60ns. We purchased two Texas Instruments 8MB, 72-pin SIMMs for a total cost of $160. In addition, the folks at Computer Craft installed the RAM—along with the CPU—on the motherboard for us and ran a test to make sure everything worked before they shipped it. Not all companies will do this; we recommend you find one that will.

Hard drive. When it comes to choosing a hard drive, size is important. Not very long ago, a 340MB hard drive was considered huge. But the newest software continues to demand more room, and the drives just continue to get bigger. We recommend at least a one gigabyte (GB) hard drive with an access speed of 11 milliseconds (ms) or lower. Make sure you get one with an IDE interface if that is what you have on your motherboard.

Don't go cheap on the hard drive; it is too important. Stick with the big names such as Western Digital and Seagate. And remember: You just can't have too much hard drive.

We chose the Caviar 21200 from Western Digital. It is an extended IDE hard drive with 1.2GB of storage and an 11ms access speed. The total cost was $209.

Disk drive. Disk drives are cheap, even the good ones. Unless you are looking for a special drive that can run both 3.5- and 5.25-inch diskettes, you should be able to find a 3.5-inch wide, 1.44MB drive with an IDE interface for relatively little cash.

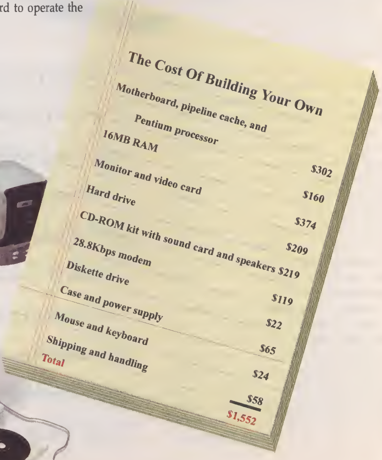
We picked a Mitsumi 1.44MB drive for $22.

Monitor and video card. Monitors can be a tricky proposition, since what sounds good on paper doesn't always look good in person. Also, postage can be pretty high for shipping a monitor. In the interest of quality and cost control, consider trying to find one locally, even if you are buying most of your components by mail order. Either way, when you buy a video card to operate the monitor, make sure the two are compatible. Again, it is probably best to buy both from the same dealer and ask to make sure the two work well together.

We recommend a 15-inch, noninterlaced, SVGA monitor with digital control and a dot pitch of .28mm or less. Monitor manufacturers measure screen sizes diagonally, so a 14-inch screen doesn't really have all that much space. A 15-inch screen is better, while a 17-inch screen is excellent.

The best test of a monitor is for you to examine it in person, view it with both text and graphics on the screen, and consider what kinds of programs you will be viewing. Then just decide what looks the best and what you can afford.

Don't bother to buy a good monitor if you plan to use a poor video card. Make sure your card is at least 64-bit and that it has 1MB or 2MB of RAM. You should also consider whether you want a card with **Motion Picture Experts Group** (MPEG) capabilities. MPEG is a video compression format that makes it easier for your computer to show full-motion video. It comes in software or hardware versions, and we recommend the software version because the hardware could limit your ability to upgrade later.



The Cost Of Building Your Own

Motherboard, pipeline cache, and Pentium processor	$302
16MB RAM	$160
Monitor and video card	$374
Hard drive	$209
CD-ROM kit with sound card and speakers	$219
28.8Kbps modem	$119
Diskette drive	$22
Case and power supply	$65
Mouse and keyboard	$24
Shipping and handling	$58
Total	$1,552

We chose a 15-inch Samtron SC-528UXL monitor with .28mm dot pitch and digital control for $329. Computer Craft offered a package deal with the monitor that included a 64-bit Video-57P card with 1MB (upgradeable) of RAM and software MPEG capabilities for $45.

Case and power supply. You can buy either a desktop or tower case. Most come with a power supply already installed. Be sure you buy one with enough bays to let you expand your system in the future. Before you buy, be sure to ask if you also receive all the interior carriage parts you need. Cases are another item that can be pretty expensive to ship, so ask about cost before you order by mail.

We purchased a Pro Case brand mid-tower with seven bays that included a power supply and everything else we needed on the inside. The cost was $65.

Keyboard and mouse. You can spend a little or a lot for these items. If you want a high-quality keyboard, you can spend upwards of $80, while a cheap brand can run you as little as $15. The same applies to the mouse. Since the low-end products are so cheap, you can buy them now and help keep down your initial cost. You always can go back and buy a better keyboard later; that way, you will have a spare in case one of them has a run-in with a can of soda.

We decided to go with a no-name keyboard for $16 and a low-end serial mouse from Genius for $8.

The Fun Stuff

Multimedia. Most computer users today wouldn't dream of buying a new computer without multimedia capabilities. When it comes to putting multimedia into your own computer, you have a number of choices. One way is to buy the CD-ROM drive, sound card, and speakers separately. That way, you can spend as much money on each item as you want. The second option is to buy a kit that contains everything you need. While buying separate pieces allows you more flexibility, buying a kit can help guarantee compatibility between the components (plus you usually get a stack of CD-ROM software titles). We don't recommend buying anything less than a 4X (quad-speed) CD-ROM drive.

We chose a kit from Creative Labs called the SoundBlaster Value CD 4X. The kit contains a 4X CD-ROM player with an IDE interface, 600 kilobytes per second transfer rate, and a 250ms access rate. The sound card is a 16-bit SoundBlaster that is upgradeable to wavetable synthesis. The speakers are decent, but nothing too fancy. We obtained our kit from A+ Computer in Sterling Heights, Mich., for $219.

Modem. If you decide you want a modem as part of your computer setup, your first decision is whether to buy an internal or external version. An internal version slides into one of the slots on your motherboard like the other cards listed above. An external modem has its own case and plugs into one of your computer's ports. The advantages of an internal modem include less clutter on your desktop, a free computer port, and a lower overall cost. The benefits of an external modem include easy installation and removal and the ability to see what the modem is doing through its set of blinking external lights.

Once you have decided on internal or external, you have to pick the speed. The faster the modem, the less time you have to wait for Internet connections and data transfers. The modems most commonly sold transmit data at 28.8 kilobits per second (Kbps). Unfortunately, these modems also cost the most. The next lowest transmits at 14.4Kbps. The cost of 14.4Kbps modems continues to drop as the 28.8Kbps modem becomes the new standard.

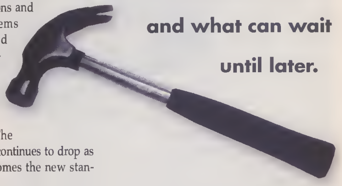
We picked a 28.8Kbps internal fax/modem from Rockwell. Its price was $119 from Computer Craft.

There are a number of other items that some people will decide they don't need, at least not right away, while others will insist they can't live without them.

The biggest item in this category is probably a printer. If you plan to use your new computer primarily for word processing, you probably will want a printer from day one. If you plan to use your new machine mostly for Internet access, you can probably do without. A tape backup is another must for some people. If you can't afford the losses that can occur if your computer crashes, you should install a tape backup drive when you build the computer. If a crash doesn't mean the end of your world, you probably can wait.

This chance to decide what is or isn't important is one of the most exciting things about building your own computer. You decide what goes in, what stays out, and what can wait until later. And you decide just how much you want to spend on each part.

The chance to decide what is or isn't important is one of the most exciting things about building your own computer. You decide what goes, what stays out, and what can wait until later.



The total cost of equipment ordered for our computer was $1,552, including shipping and handling. We should point out that this doesn't include any software, which you normally find in relative abundance in most store-bought computer packages.

Now that we've picked out all of our dream equipment, the real fun begins next month. It's time to build. ●

by Tom Mainelli

For More Information

A+ Computer
(800) 505-7400
(810) 264-4269

Computer Craft Inc.
(800) 487-4910
(813) 327-7559

InfoLinc Computer Systems & Solutions
(402) 477-2929

Intel's MMX Boosts Multimedia

Today's Pentiums, once the hottest consumer CPUs on the block, are starting their inevitable slip in the microprocessor pantheon.

Intel plans to roll out new versions of its flagship desktop chip later this year, featuring special multimedia extensions for zipping through graphics and sound-intensive tasks. Intel calls its "MMX" multimedia instruction set the most significant enhancement to the Intel chip architecture since the 386 CPU, which extended the 80x86 family to 32 bits.

While Intel's statement invites charges of public relations exaggeration, designers at software companies from Macromedia to Microsoft are lining up to incorporate the new technology into their code. Users will get to see for themselves how speedy MMX really is by the fourth quarter of 1996. The first MMX-enhanced Pentium, code-named P55C, is set to begin shipping toward the end of the year, with large-volume shipments ramping up in 1997. Because MMX instructions must be built into the CPU, owners of existing 486s, or even Pentiums, won't be able to add MMX to their systems without upgrading the entire chip.

■ Inside MMX

The 57 instructions that make up MMX use a technique called Single Instruction, Multiple Data (SIMD) to deliver better performance by performing more tasks in **parallel**, or at the same time. Joanne Hasegawa, an Intel spokesperson, says MMX works because of the nature of most multimedia programming code.

"Multimedia and communications code tends to be small and repetitive," she says, "but there just seems to be so much of it." MMX lets the chip churn through more of these operations at once rather than **serially**, or one after another. When the chip does more jobs at the same time, everything speeds up.

Intel says the performance boost will let its processors run several simultaneous, CPU-intensive multimedia tasks with more than enough power left over for additional applications. MMX is an attempt to keep the Intel-based PC in its position as the premier tool for running today's graphics-rich multimedia software and games. Other microprocessor companies such as Sun have added similar instructions to their architectures, but MMX appears to be the most ambitious such attempt to date.

MMX technology is based upon a careful analysis of multimedia applications. Intel engineers found that most video, music, image processing, and game applications shared several key features in the way they used a CPU's computing time. Chief among these was the large number of small, repetitive loops a program goes through to redraw screen elements or replay bits of sounds. MMX technology adds certain instructions to Intel chips to grant them special capabilities for dealing with these short, repetitive arithmetic operations.

In a graphics application, for instance, the individual pixels—the tiny dots that together make an image on a screen—usually are represented inside the computer as 8-bit numbers, or **bytes**. In a chip using MMX technology, eight of these bytes might be packed into one 64-bit number and moved together into the MMX area of the CPU. The necessary mathematical operations then are performed on all eight bytes at the same time.

The faster performance provided by this advanced number-crunching means developers can pump bigger data strings through the CPU in the time smaller strings now take. This ability leads not only to faster software, but to better software.

■ Add Color

Mark Rein, vice president of Epic MegaGames, says the most noticeable difference MMX will bring is the widespread use of 24-bit True Color. Most software today uses what is called **8-bit color**, which lets programmers use a palette of 256 different colors in a given scene. **True Color** offers a dramatically richer range of 16.7 million different colors, more than the human eye can distinguish. Rein says the difference between 8-bit and 24-bit color is dramatic.

"It's a dream come true for programmers," he says. "The programmers just love this." Rein says MMX will let game graphics finally achieve the same color quality as television. Users also will see improvement in audio, he says, as developers move from 11-bit sounds to richer 44-bit sounds.

Such gains will launch a new generation of games and multimedia software, but the new programs shouldn't force consumers to spend more on hardware and software. With more multimedia capability built into the CPU, fewer add-on graphics and sound cards will be necessary. Instead of shelling out extra cash for expansion cards, power users will already have everything they need.

"The bottom line is the Pentium processor is a lot more powerful now with MMX," Rein says, "and you'll be able to do a lot more things people used to do with add-on cards."

Not every application will benefit from MMX. Those that do will use heavy amounts of graphics, audio, speech recognition, video, and data compression. Programs that don't need MMX's special abilities will run at the same speed as they would on otherwise similar non-MMX CPUs. When the right program does come along, however, 50% to 200% speed gains are possible, Intel says, along with the ability to run more simultaneous multimedia applications.

Intel doesn't leave out the other hot topics of computerdom—the Internet and online services. MMX could make some communications programs run faster, the company says. The same structures that handle graphics with greater efficiency also can run the compression/decompression algorithms used in file transfers. As with the compression built into modems and communications applications, however, any increase in throughput depends heavily upon what type of file you are transferring.

Intel says MMX will work with any current operating system and won't hinder existing applications. Just as some applications today run on a 486 CPU but perform better on a Pentium, MMX-optimized applications will run on today's processors. Such programs will achieve their potential, however, only with an MMX chip. Eventually, there may be applications that will run only on a chip with MMX capabilities, just as we see applications today that run poorly on anything but a Pentium.

Though Intel cranked up the PR machine trumpeting the benefits of MMX in March, systems with the new chips won't arrive in the marketplace until late this year. The intervening time will give developers a chance to examine their applications to determine what code must change in order to take advantage of MMX. Intel's Hasegawa says the company has been working with software designers for some time to prepare MMX titles for the marketplace. A number of software development tool vendors will have MMX-compatible products out very soon, she says. Among them will be Microsoft, which plans to incorporate MMX technology into future releases of developer tools such as Visual C++ and the Direct 3D API. (An **API**, or **application programming interface**, is software that an application uses to carry out certain functions.)

Both Hasegawa and Rein say a few applications using the MMX instructions will be out by the end of the year along with the P55C, but the big push will come in 1997. Hasegawa says she expects developers to target MMX titles at the multimedia family PC in the beginning.

"MMX technology will find its way first into the home market segment because that's where the multimedia infrastructure resides today," she says. However, Intel expects MMX to dominate all market segments in the future. By the end of 1997, every new Intel processor will include MMX technology.

In With The New

As always, the arrival of a new technology doesn't automatically mean old computers are obsolete. As long as a CPU performs well enough to run the applications you use, there isn't much point to buying the brand-new biggest and best. For the true game buff or those interested in cutting-edge multimedia and graphics design, however, it appears MMX rapidly will become a necessity.

That's all right by Intel. As more and more computer functions come to rely on the main processor, the company stands to make more and more money. Fortunately, MMX makes sense for the user as well. Faster responses, fewer compatibility problems from balky add-on cards, and lower system prices are welcome gifts from the ruling chip god of the desktop. MMX alone won't give many owners of today's systems cause to embark on a costly upgrade, but those new to the market will get more than ever before from that "Intel Inside" sticker. ●

by Alan Phelps

For More Information:

Intel Corp.
(800) 321-4044
faxback: (800) 525-3019
http://www.intel.com

Intel Puts Its Chips On The Future

Today's top-of-the-line 166MHz Pentium and 200MHz Pentium Pro CPUs seem fast, but MMX technology and ever-rising clock speeds continue to present a moving target to those attempting to compete with Intel.

THE PENTIUM LINE

Pentium-200
- Expected: mid-1996
- Speed: 200MHz
- Features: The fastest Pentium around until late 1996.

The "P55C"
- Expected: late 1996
- Speed: expected to be 200MHz
- Features: First chip to include MMX technology.
- Intel plans to push the P55C for the home market, but developers may prefer the Pentium Pro once it becomes widely available.

THE PENTIUM PRO (P6) LINE

"Klamath"
- Expected: early 1997
- Speed: Probably 200MHz
- Features: Lack of level 2 (L2) **cache** will lower chip price. (A cache speeds processing by storing frequently accessed data in a convenient memory location.)

"Deschutes"
- Expected: mid- to late 1997
- Speed: Could be as fast as 300MHz
- Features: Also lacks L2 cache. May run on a 75MHz bus.
- Intel is aiming mainly for the corporate desktop market with the Pro.

THE P7 LINE

"Merced"
- Expected: probably in 1998
- Features: MMX instructions will reach their fullest potential in this 64-bit processor. The chip will benefit from a new 64-bit, Unix-based operating system, dubbed "Summit 3D," being developed by Hewlett-Packard.

Quality Portables Reach A Practical Price

There has never been a better time to buy a good, value-priced portable computer.

Though this sounds like countless overblown advertisements, today's market really does offer customers more hope than hype. Since the beginning of this year, just about every major portable manufacturer has introduced a quality computer with Intel's Pentium central processing unit (CPU)—or a comparable 586 processor—for around $2,000. At the end of 1995, that same amount of money bought only a 486-based machine. Though the new value machines might lack the bells and whistles of some of the fancier premium models, the majority have enough speed, memory, and storage to get the job done.

For years, customers have been scared away from the portable computer market by high prices on the premium machines, and lower quality and technology on the value products. Now, it seems, manufacturers have found a way to produce quality portable computers that more people can use and afford.

■ Just The Basics

The evolution of this new generation of value portable computers picked up steam as manufacturers began to realize, through research, that there was a large number of people interested in purchasing a quality machine without all the latest technological gizmos, says Mike McGuire, a senior analyst for mobile computing at the market research firm Dataquest.

Dataquest surveys show that many of the people who are serious about portable computing use it for word processing, spreadsheets, E-mail, some database access, and maybe some presentations, McGuire says.

Everybody doesn't need a CD-ROM drive and full-motion video to get their work done, and not everyone can afford to pay for technology they won't use. Most users need a fast processor that will perform well for at least two years (higher than a 486), enough RAM (at least eight megabytes [MB]), a good-sized hard drive (500MB or larger), a decent screen (at least a dual-scan), and maybe a modem.

That's why manufacturers have responded with these basic value machines that have everything the average user needs, and little more.

"What we are getting now is these feature sets that are 'good enough,' for most of the mobile workers in the world," McGuire says.

Obviously everybody would like to have the latest in technology, he says. It's like wanting a sports car and settling for an economy car. But the real question is, do you really need all that computing power, or do you just want the coolest toy? Some people find they really do need the best there is, but most realize they can survive with something less.

■ Toshiba Takes the Lead

Toshiba was the first of the big four portable manufacturers (which also include NEC, IBM, and Compaq) to break the industry's own $2,000 magic price point with a Pentium-based portable computer. On Feb. 1, the company officially released the Satellite 100CS with a base price of $1,999. The basic 100CS includes a 75 megahertz (MHz) Intel Pentium processor, a 10.4-inch dual-scan screen, a 504MB hard drive, 8MB of random-access memory (RAM), an internal diskette drive, and access to Types I, II, and III PC Card slots. (Dual-scan screens are of a little lesser quality than the active-matrix screens found on many new portables.)

The 100CS, though nothing fancy, is plenty of machine for the average road warrior, according to McGuire.

"It doesn't have all the latest gee-whiz, bleeding-edge features," McGuire says. "It is a very bare-bones product. It doesn't have sound or any of that, but it is a good, solid workhorse for the majority of mobile workers."

McGuire's assessment appears to be pretty accurate, as the 100CS has found a large market of willing buyers. According to Terry Cronin, Toshiba product manager for the Satellite line, the 100CS has been very successful.

So successful that he says he expects the 100CS to be among the company's top sellers in 1996. That's no small feat when you consider the large number and variety of portable computers Toshiba sells. The company led the portable computer industry in 1995 with a 15% market share, according to Dataquest. The 100CS undoubtedly represents one way Toshiba intends to stay on top.

The 100CS' early February release established the machine as the value Pentium to beat in 1996. Cronin says he wasn't surprised by the 100CS' early success, but he says he expected more of the other manufacturers' new machines to follow closely behind the100CS release. "We have been surprised by how slow the competition has been to respond," he says.

Slow, perhaps, by computer industry standards.

NEC, the owner of the third-largest market share in 1995 at 10%, officially introduced its new value portables on Feb. 20. The line includes a Cyrix 5x86-based machine priced at $1,799 and two 75MHz Pentium models called the Versa 2200 and 2205C. NEC's new Pentium portables, at $2,449 and $2,499 respectively, cost more than Toshiba's 100CS, but they offer the same basic tools as well as a few extras. Both have active-matrix screens, 810MB hard drives, and touchpad pointing devices. The 2205 also has a built-in 14.4 kilobits per second (Kbps) fax/modem.

The 1995 market's number-four player, IBM, introduced its new value line of computers in late April. The ThinkPad 365 comes in a variety of configurations, from a bare-bones machine with a 5x86-based processor for around $1,800 to a ritzy version with a 120MHz Pentium, an active-matrix screen, an internal CD-ROM drive, and a bigger price tag. These new ThinkPads could mark a big change for IBM, which traditionally focused its attention on high-end machines. McGuire says he sees the new 365s as IBM's way of trying to win back some of the market share lost to NEC last year. IBM finished 1995 with a 9.9% market share in Dataquest's report.

Compaq, the industry's second biggest player with an 11% market share in the Dataquest report, planned to introduce its newest machines in late June; detailed information was unavailable for this story. According to Compaq, a Pentium-based machine for less than $2,000 was set for the June release.

So why are all the big players suddenly so interested in selling machines in a value market that accounted for a very small percentage of the total sales in 1995? There are a number of reasons.

■ Market Wars

The big four are pushing their value lines so hard mainly because they all want to sell more computers in order to hold on to, and add to, the market share they possessed in 1995. Owning a good-sized chunk of the portable computer market makes it possible for a company to build and sell more machines. If they sell more computers, they can make more money, and they can use that money to build more computers, etc. It's a snowball effect, with strong sales making more sales possible, and market share rising as an ever-increasing number of units are sold. Every portable manufacturing company is out to gain market share, especially right now, with Dataquest predicting a 26% growth in the portables market in 1996.

And it's not just a battle among the big four. There are plenty of other portable manufacturing companies to watch. Large computer companies such as Dell, Texas Instruments, and Fujitsu are working hard to increase their small percentages of the portables market, while small companies such as WinBook and Chem USA continue fighting to make their presence felt. Still other companies are planning to make a big splash as they enter the portables market for the first time.

When a big company such as Hitachi joins a new market, McGuire says, it will do what it has to in order to win some market share. That means offering products at very low prices and forcing other companies to lower prices to stay competitive.

■ Cost Down, Quality Up

Another reason manufacturers have taken a new interest in the value machines, McGuire says, is because today it is simply easier to build a quality computer for less money.

"Much of the technology that used to be really expensive has dropped in cost dramatically in the last year and a half," he says.

One good example are the screens used in the manufacturing of portable computers. All portables use some form of a liquid-crystal display (LCD) screen, which is a thin, lightweight replacement for the bulky monitors used with desktops computers. LCD screens are very difficult to make (especially active-matrix), and it has taken some time for manufacturers to get it right. But over time, the various companies making the screens have improved the process, so their yields have increased, quality is up, and prices are down.

In addition to these improvements, prices also have been driven down further as other companies join the parts manufacturing market, McGuire says. Like a new company entering the business at the sales end of the market, companies in the parts manufacturing business must establish themselves and gain market share to be competitive. Some new companies even will offer their products at or below cost for a time in an effort to win some market share.

Screens aren't the only computer parts that have become more affordable. Scenarios like this have played out throughout the computer parts manufacturing industry. The result: low-cost, quality parts that manufacturers can use to create premium-quality machines that sell at value prices.

As price-conscious consumers explore the value market and spend their money there, McGuire foresees a fundamental shift in sales numbers occurring as the value machines replace the premium machines as the big sales items. The top manufacturers probably will do 70% to 80% of their sales in 1996 in the value market, which should help fuel the already intense competition. Prices should reflect that competition for the months to come.

And that is good news for those computer users who have waited a long time for a truly good deal on a portable computer. ●

by Tom Mainelli

For More Information:

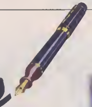
Compaq
To be announced
(800) 888-5996
http://www.compaq.com/productinfo/current.html

Satellite 100CS
Toshiba
(800) 457-7777
(714) 583-3800
http://www.toshiba.com/tais/csd/products/index2.htm

ThinkPad 365
IBM
(800) 426-2968
(919) 517-2430
http://www.pc.ibm.com/thinkpad

Versa 550D, 2200, and 2205C
NEC
(800) 632-8377
(508) 264-8000
http://www.nec.com

PDAs



Personal Digital Assistants Or Powerless Desktop Aspirees?

One of the most exciting aspects of developing computer technology is the microworld of handheld devices. Who hasn't dreamed of a wrist television or a two-way communicator? How about a computer that fits in your shirt pocket and has as much power as your desktop PC? When will the props of "Star Trek" become contemporary tools, or are they already?

The continuing miniaturization of computing components has shrunk computers the size of houses to portable PCs that sit on your lap. Notebook computers can do everything their desktop cousins can and while on the road. But what happens when you make them even smaller? Are palmtop computers little more than glorified calculators? Or are they realizations of our tiniest dreams?

The Ghost Of PDA Past

Palmtop computers, or **personal digital assistants (PDAs)**, have been around for a while. The first "Year of the PDA" was declared in 1992, but nobody bought them. Then 1994 became "The Second Year of the PDA," but again nobody bought them. Why were portable computers unable to make the jump from the lap to the hand, and why do PDA developers think 1996 will finally be their year?

There is much speculation about the main cause of lackluster PDA sales, but it's really a compilation of many factors. The market for palmtops was, and is, there. Almost all PC owners could find a use for a tiny unit they could carry around and use to update information on their desktop PC. Unfortunately, the palmtops that first stepped into the marketplace should have stayed at home.

When PDAs were originally introduced, developers touted them as the next step up (or down) from notebook computers. But early PDAs combined sporadic, slow hookups to desktop computers and the Internet with limited abilities and pathetic input devices (see "Reading The Writing On The Screen" on following page). They drained life from their batteries faster than a Ford Pinto, and for all this, they were overpriced. After these initial failures, many potential buyers of palmtops are a bit leery, says Mike McGuire, senior industry analyst for mobile computing at Dataquest. "These things have been suffering from this huge hangover of hype."

Now consumers wonder whether developers learned from previous problems and prepared their new lines to meet the demands of consumers. We looked at the qualifications of three new PDAs. The Sharp Zaurus ZR-5800FX is a clunky, but powerful, palmtop that comes with a built-in fax/modem. The Psion 3a is a sleeker model, but it's more limited. And the much-anticipated Palm Pilot 5000 doesn't do as much as the others, but what it does, it does very well.

The Resurrection Of PDA Present

Sharp Zaurus. Do these new PDAs eliminate the inadequacies of previous models? Let's take a look. The Sharp Zaurus ZR-5800FX comes with a 2400 bits per second (bps) fax/modem that lets you connect to a local-area network (LAN) or the Internet (PC connectivity software and link are optional extras). Although the connection is slow, it worked well when we tried it. We logged in to an Internet service provider (ISP) and checked our E-mail without any difficulty. The only irritant occurred during the viewing of a message. The screen held only about two-thirds of each message, and the slow connection made scrolling a sloth-like task.

Aside from the slow modem, the rest of the Zaurus' performance was exemplary. Its two megabytes (MB) of random-access memory (RAM) helped the different applications load and save very quickly; even the "search" option was speedy. The Zaurus' abilities would meet almost anyone's needs. The word processing, spreadsheet, data filing, and daily organizer programs are extensive and friendly. The unit is a bit hefty (it weighs almost a pound), and it's too large for a suitcoat pocket.

The keyboard is typical of a palmtop (meaning it reduces typing to hunting and pecking), but unless you're doing some heavy typing, the pen-sensitive screen will be your main avenue of exploration. The notepad and scrapbook let you draw or take freehand notes with the pen, and the sidebar menus allow easy manipulation of programs. The designers threw in some nice touches, including an optional backlight and a start-up screen that you can personalize.

The Zaurus is powered by two AA batteries that should last around 70 hours. We used the unit (and the backlight) pretty extensively for several weeks, and the batteries were still going strong. The unit is a bit pricey (around $740—without the fax/modem, it's about $90 less), but it makes a good accessory for your desktop, especially if you do a lot of work on the go.

Psion 3a. The Psion 3a is a more compact model with fewer options. It comes without a modem or a decent PC connectivity link. For an additional $99, you can get *PsiWin*, Psion's serial Windows interface, which does a great job of keeping files on both the 3a and the desktop updated. The connectivity gives you information exchange at up to 19,200 **baud** (roughly the number of bits transmitted per second) and makes it as easy as dragging the files from one location to another. It also provides a fast connection to modems and serial printers.

A plodding modem hinders the Zaurus' otherwise excellent performance.

The 3a has only 1MB of RAM, but everything loaded up and saved rapidly. The word processor, spreadsheet, and database were easy to use and as complete as those of the Zaurus, but the daily organizer didn't have as many options. (This isn't necessarily a bad thing; too many menus and on-screen items can clutter the tiny screens very rapidly).

The 3a is much more concise than the Zaurus, and its size shows as much. The unit (which would fit in a big pocket) is quite a bit smaller than the Zaurus and weighs in at less than half a pound with batteries. The 3a has a similar tiny keyboard, but no pen for touch-screen input. A touch-sensitive menu between the keyboard and screen lets you switch between tasks, but the keyboard-only input gets a bit annoying when it isn't clear which key to hit to change options or enter information.

The 3a has some neat extras that the Zaurus couldn't boast of. It includes the solitaire game *Patience* and a world map that gives you the time of any major city in the world and the distance from that city to your hometown.

The 3a is also powered by two AA batteries, which should last up to 80 hours. It's much cheaper than the Zaurus at around $470, and with streamlined options, the 3a would be a good desktop complement for the average user.

The Zaurus and the 3a are typical palmtops that tried to fine-tune the PDA concept while seeking their place in the computing industry.

Reading The Writing On The ~~Wall~~ *Screen*

Handwriting recognition technology has always proved elusive for the same reason that handwriting analysts have a job: Everyone's writing is unique. There are so many ways to print or write individual characters and words that it is nearly impossible to develop a program that can uniformly recognize what they are.

When PDAs first arrived on the scene, on-screen writing was seen as a reliable way to input information; unfortunately, early handwriting recognition software was completely inept and frustrating, says Mike McGuire, senior industry analyst for mobile computing at Dataquest. "There was a heavy reliance on handwriting recognition as the primary, if not the only, way to get data into these things."

Early users also were forced to "train" their PDAs to recognize their handwriting.

One company gets around this inconsistency by forcing all of its pen-wielding users to write the same way. The new Palm Pilot uses Palm's own *Graffiti* handwriting recognition software. Instead of training the PDA, the user must learn the writing style of the palmtop. If users fail to shape their characters correctly, the program often will misread them. For example, we tried writing "The pen is mightier than the keyboard" in normal alphabetic characters and then with the changes required by the software.

The first time it came out like this: "i hz pxh is misei iev i hsh yhz iczdboov{."

The second time, with some subtle changes in how the letters were entered, it came out: "The pen is mightier than the keyboard."

Certain letters that require more than one stroke when printed, such as *A* and *T*, need to be entered a bit differently. ("A" is entered "Λ," and "E" is entered "ε.") The changes are easy to learn, and the Pilot comes with a game to help you learn the different characters.

Though the accuracy is quite high, the process is still a bit tedious. This bothers a lot of users who want to enter large amounts of information into the PDA, McGuire says. "What you should be doing is just short stuff . . . mnemonic devices for notes, names, addresses, phone numbers."

Handwriting input is big in countries with more uniform characters in their written languages, such as Japan, which has a huge market for PDAs, and China. The new *WisdomPen* software by Motorola Lexicus has an accuracy rating of 95% in recognizing even "cursive" Chinese characters.

Almost perfect is still far from perfect, McGuire says. "Handwriting recognition is never going to be good enough. Ninety-five percent, no offense to Lexicus, isn't good enough for a broad horizontal market for these things." He says that any mistakes the software makes waste the user's time. "What happens is, I'm spending time dealing with this product instead of getting work done. I should be able to render text in handwriting recognition at least as good as I type."

While handwriting recognition may never be the primary way to input data into a PDA, someday it may be improved enough to allow users the option of writing cursive without cursing.

The 3a boasts powerful applications, but its keyboard makes getting to them clumsy.

The designers studied why PDAs failed in the past and tried to make the appropriate changes in performance. The connectivity has gotten smoother, performance has improved, power consumption has decreased, and prices have even dropped somewhat.

Is it enough to make these changes and then reintroduce a PDA into a market that doesn't want just Lilliputian desktop tools? McGuire doesn't think so. "They keep trying to cram desktop functionality into these little devices and these little screens, and that's not what people want," he says.

The Pilot. Palm Computing, maker of the Pilot, agrees with him. Ed Colligan, vice president of marketing for the Palm Computing division of US Robotics, says, "We don't try to do spreadsheets and word processing and confuse people. Eighty percent of the time, people who buy these devices are using a date book, address book, to-do list, and a memo pad. We let them add on software if they want other functionalities."

Current PDA users have greatly anticipated the Palm Pilot's arrival. Palm claims the new organizer will revolutionize the PDA industry. Although not even called a PDA by developers (it's an **electronic connected organizer [ECO]**), the Pilot, and future models like it, could actually break the stigma attached to palmtops.

The first thing you notice about the Pilot is its size. Weighing just 5.5 ounces and being almost all screen, the Pilot is easily pocketable—even in a shirt pocket. Being so small, the Pilot is limited in performance. It lacks spreadsheets, databases, etc., but it has a decent planner and room for lots of contacts. The Pilot 1000 holds about 500 addresses and 600 appointments, while the 5000 model has room for 2,500 addresses and 2,400 appointments.

So it's an electronic Rolodex. Big deal. Without its amazing PC connectivity, the Pilot would be nothing more than a souped-up calculator and address book. But it comes with a desktop cradle that holds it at a usable angle for working with the screen. And, with the touch of one button, the Pilot "hot syncs" with your desktop and almost instantly updates the address books, to-do lists, daily planner, and memos on both itself and the PC.

The Pilot runs on two AAA batteries (which should last for several months), switches among programs very rapidly, has an excellent "search" option, offers decent handwriting recognition (see sidebar for more information), and costs around $300. (The 1000 is $299, and the 5000 is $369.)

Despite its strengths, the Pilot is limited in several minor ways. It's difficult to enter a sizable amount of information into the unit, and it lacks a modem. But it was designed to easily take on new peripherals and applications. The only major drawback is its inability to let the user sketch images. The company, forced to delay the product once, decided to present the Pilot without this feature before it faced further delays. "You've got to ship the thing at some point," Colligan says. "We said, 'Let's ship it the way it is, and we can add that on.' (Drawing is) a low-hanging fruit kind of application that either ourselves or somebody will produce for the product."

The Spirit Of PDA Future

McGuire seems to think the Palm Pilot is the model for future PDAs. "It finally gets the right form factor for these things," he says. "If I get something as small as a Pilot and there are going to be other products in that form factor, one hopes, that's an unconsciously portable device."

A major dream of palmtop users, in addition to the prime directive of effortless PDA transportation, is wireless communication. Nokia recently introduced the 9000 Communicator, a smart phone that features wireless voice, fax, and E-mail capabilities. The Nokia also boasts an address book, which users can access via a small on-screen keypad. The Communicator will be released this summer, but only in Europe and Asia, due to the lack of a cellular standard in the United States.

Microsoft also is looking to re-enter the PDA fray after pulling the plug on its WinPad when Apple's Newton and other PDAs faired poorly about two years ago. The corporate giant is working on its own minicomputer, called the Internet PDA, with a rumored $500 price tag and a Christmas release.

"These things ultimately evolve into smart pagers and smart phones," McGuire says. "There are going to be two sets of devices: slightly larger products that are more like smart phones, and ultimately what we want are these unconsciously portable devices, which probably are going to be smart pagers."

The industry isn't to the point where you can tap a communicator on your chest and speak to the captain on the bridge. It's getting there, but not much faster than impulse speed. ●

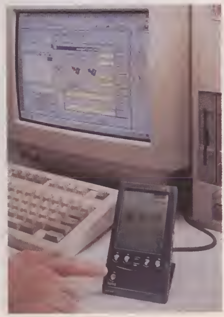
by Joel Strauch

For More Information:

Pilot 1000 and *5000*
Palm Computing Division
US Robotics
(800) 881-7256, (415) 949-9560
http://www.usr.com/palm

Psion 3a
Psion Inc.
(800) 997-7466, (508) 371-0310
http://www.psionic.com

Zaurus ZR-5800FX
Sharp Electronics Corp.
(800) 237-4277, (201) 529-8200
http://www.sharp-usa.com



The Palm Pilot's trim size and PC connectivity could make it the example for future PDAs.

Wireless Computing

Increases The Price Of Freedom

Connectivity is great. The wires that actually do the connecting aren't so great.

Mobile computer users don't have to give up powerful processors or big hard drives anymore, but the desktop and all its wires still hold a monopoly on speedy, full-time network access. A growing list of wireless solutions for roving users provides the exhilarating opportunity to download E-mail, files, and faxes from thin air, but be prepared for generally slow speeds and occasionally horrific bills.

The wireless fast lane exists only at short range. Wireless local-area network (LAN) technology is reliable, but generally designed to work only in buildings or corporate campuses. Wireless remote network bridges link two LANs across town without laying costly cable. However, these systems only work when employees don't roam too far from the office.

After leaving the confines of home base, how you choose to connect depends upon how far away you want to get from it all. In close, the best bet is infrared—the same light-based technology used in television remote controls. Infrared ports are fast becoming standard equipment on portable computers. The latest portables from Sharp and Hewlett-Packard include ports that can transfer data at rates as fast as four **megabits per second** (**Mbps**, or about one million bits per second). (By contrast, most of today's modems transmit 28.8 **kilobits** [Kbps, about one thousand bits] per second.)

"It's predicted to reach 10Mbps speeds in the near future," says Janet Courtenay, director of marketing for the Infrared Data Association. "Some engineers say 50Mbps is feasible, but not for a few years."

Infrared ports are beginning to replace cables on peripherals from printers to keyboards. The most exciting applications, however, are just over the horizon. In Japan, public telephones are sprouting the small transmitter/receivers, making it easy for business travelers to send data over phone lines from airports and other sites. Public printers and other devices could follow.

Far Out

The official standard for infrared transmission sets the range at 1 meter, but many users find the connection will work at three or four times that. The extra space gives portable PC users some room to maneuver in the office or airport, but a 4-meter range doesn't go that far down the road. Connecting across miles requires the use of another part of the electromagnetic spectrum. Two choices are available: circuit-switched cellular networks and packet-switched radio networks.

Circuit-switched cellular networks use the existing cellular/telephone system to transmit data. A special cellular modem is required, along with a special cable to connect the modem to a cellular phone. Derek Maloney, product marketing manager for Apex Data, Inc. of Fremont, Calif., says his company sells a Mobile Plus cellular fax/modem that fits in a **PC Card** slot for about $300. The cable is $69 extra. (PC Cards are credit-card-sized devices that plug into portables and offer expanded capabilities.)

A few firms sell adapters that convert standard modems to cellular modems, but true cellular modems are more forgiving of noisy airwave conditions. Despite error-correcting protocols, cellular modems still fight to get data through static haze. Maloney says cellular data transfer is limited to 14.4Kbps, less than half the speed of the fastest land-line modems.

"The signal is really poor," he says. "For voice it's OK, but for data that doesn't work too well."

Slow speeds mean more expensive cellular air time. The links are also relatively unreliable. It's common to lose a connection as you move from one cell to another. However, cellular modems can be very convenient. With a cell modem and an Internet account, the 'Net is never more than a phone call away. Cellular service is widespread, and the modems can be very small. AirGo Communications recently announced the first cellular phone/modem that fits entirely in a PC Card slot. The $1,000 unit includes a small antenna.

Closely related to cellular connections is **Cellular Digital Packet Data** (**CDPD**) technology, a hybrid of circuit-switched and packet-switched systems. Users connect with special CDPD modems at up to 19.2Kbps. Data is routed through unused cellular channels for better quality. As we went to press, CDPD was available in only about 50 U.S. cities.

A more widespread alternative are **packet-switched radio services**. These proprietary networks require special modems and usually charge according to the amount of data packets sent and received rather than air time. With this system, you can start to move away from cellular expenses, but don't expect to get too far.

Ardis is a nationwide packet radio system that serves more than 400 metropolitan areas in 50 states, Puerto Rico, and the Virgin Islands. Ardis users can exchange E-mail with anyone on the 'Net, access news and sports scores, fax documents, and transfer files. At 9.6Kbps, data transfer on Ardis is even slower than cellular, and pricing is steep: After a one-time $99 activation fee, users pay from $20 to transmit 20KB per month up to $190 for 750KB. The special modems can cost around $500.

Ardis' main competitor is RAM Mobile Data of Woodbridge, N.J., a somewhat smaller system that covers more than 250 metropolitan areas along with many major airports. RAM transmission speeds are in the same range as Ardis, from 4.8Kbps to 9.6Kbps. Using RAM also requires the special radio modems. Pricing ranges from $25 per month for 100KB of use to $135 for 500KB.

Both services are geared toward business users who must keep in contact through E-mail and other short messages. The systems' high prices limit the amount of data that can be exchanged with the home office, and Internet browsing is out of the question.

Ricochet

A Los Gatos, Calif., company called Metricom is riding to the rescue for individuals in a growing number of cities. The firm's Ricochet network offers several advantages over RAM and Ardis, such as 28.8Kbps transfer speeds and an aggressive pricing plan that leaves competitors in the dust. With Ricochet, $40/month gets you rental of the necessary battery-powered radio modem, an Internet account, and *unlimited* use of the network. Students and schools get the same deal for $30/month. With no extra usage fees, many Ricochet users leave their computers connected at all times.

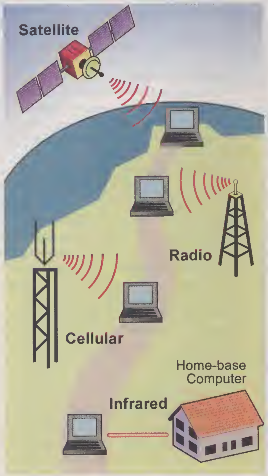
The company can afford to charge such low rates because of the nature of its network. Instead of the cellular telephone-like towers the other radio services employ, Ricochet uses scads of low-power, $700 shoebox-sized transmitter/receiver units typically attached to light poles. The units are scattered about half a mile apart throughout metropolitan areas or campuses to form a mesh-type network. At certain points, land lines provide short cuts across town and telephone modems for connecting to online services.

Ricochet's service is limited mainly to the San Francisco Bay Area and Seattle now, but the company expects Washington, D.C., to be wired by August, with Los Angeles, Boston, and New York City following next year. After that, Ricochet plans to cover the coasts.

Greg Dalzell, director of product marketing for Ricochet, says the company hopes to offer ISDN speeds (126Kbps) within three years and is investigating what's needed for vastly faster, T1-level (1.544Mbps) speeds. (**Integrated Services Digital Network** connections transmit data digitally.) The goal, he says, is to stay competitive with land-based phone lines. Dalzell says the technology is less of a problem than convincing cities to let Ricochet rent space on light poles.

"The difficulties we face are more administrative and bureaucratic than technology-based," he says. "The tough thing is to get right-of-way."

Assuming local governments see the value in Ricochet, the company hopes to go nationwide or even international in the future. However successful Metricom grows, however, odds are the entire world won't soon be covered with shoebox transmitters. Delivering wireless access to the truly global community means leaving the planet entirely. Only satellite systems offer long-term solutions for data transfer at sea and in less-developed, nonurbanized areas.



Wireless options are growing as more and more users leave the desk behind. How you connect often depends on how far you roam.

Several voice/data satellite systems are in various stages of deployment, design, or dreams. Generally, the schemes fall into two camps: geostationary orbit (GEO) and low-Earth orbit (LEO) systems. GEO satellites hang 22,300 miles above the Earth. Just a few GEO satellites can cover large portions of the globe with wireless capabilities. LEO systems, on the other hand, orbit about 700 miles up. To assure coverage of large areas with LEOs, dozens or even hundreds of satellites are required.

However, LEOs offer one major benefit over GEOs. GEOs are great for broadcasting applications, such as satellite TV. For two-way communications, however, the distance at which GEOs orbit introduces a considerable time delay. Even at the speed of light, half a second passes before data can make the round trip from the ground to the satellite and back. While the delay is mildly irritating for voice communications, it severely limits the speed of Internet communications. Because of the way the Internet's TCP/IP (Transmission Control Protocol/Internet Protocol) works, the maximum two-way speed a GEOs system can accommodate is 64Kbps—not nearly enough to handle future needs.

There is a way around the delay for certain types of communications. Hughes Network Systems, the company that brings us DirecTV, also offers DirecPC, a 400Kbps link from the Internet. The key word is "from." Downloads from the geostationary satellite are fast, but all outgoing communication is handled over a standard phone line. For browsing the World Wide Web, such a system works well. The only signals most users send in this situation are clicks from a mouse to switch from page to page, which means the uplink doesn't have to be as fast as the downlink. The price isn't bad, either. The equipment, including the 24-inch satellite dish, costs around $750. Monthly charges vary according to use of the service. For $15.95/month, you can download 30 megabytes (MB) of data.

As the Internet grows into more of a two-way communications medium, however, the telephone line uplink won't make the grade. Two-way voice and video communications require faster speeds than the phone line can offer. Broadcast data schemes are definitely useful and will no doubt command certain markets, but the true Information Skyway demands fast speeds on both ends for effective communication. The only way to do that is with an LEO system, where distances are much smaller so transmissions can be faster.

Planned LEOs run from one end of the speed spectrum to the other. On the slow side lies ORBCOMM, a joint venture between Teleglobe and the Orbital Sciences Corp. ORBCOMM's first two satellites were launched in April 1995. The companies expect to have a fleet of 36 satellites in orbit by mid-1997. ORBCOMM lets users transmit messages on small handheld devices or devices integrated with palmtop computers. The transmitters need only a whip antenna pointed to the sky anywhere in the world. Supposedly the system will work with networks such as Ardis and RAM Mobile Data. However, the transfer speeds of around 4.8Kbps are good only for short messaging, telemetry, or paging.

Somewhere in the middle of the capacity spectrum are larger LEO systems like the Motorola-led, $3.4 billion Iridium venture. Iridium includes 66 satellites and is scheduled to begin operation in 1998. The $1.8 billion, 48-satellite Globalstar system also plans a 1998 start. INMARSAT's ICO system is a similar 10-satellite, $2.6 billion network. All of these large LEO projects are designed primarily for mobile voice service, a sort of world-wide cellular system in the sky. Although the bandwidth is generally low, they also could be used for short data communications such as E-mail and small file transfers.

Street lights provide a home for Ricochet's transmitter/receivers.

Road To The Skyway

Eclipsing all these proposals is perhaps the most ambitious plan: Teledesic. Funded in part by Microsoft CEO Bill Gates and McCaw Cellular's Craig McCaw, the $9 billion, 840-satellite system would provide point-to-point, broadband (2Mbps) communications anywhere in the world by 2002. The system is designed for primarily fixed-location service, or wherever someone might want to mount the necessary small antenna dish, such as ships at sea. In this way, Teledesic is really an extension of the ground-based, superfast fiber optic network.

Tren Griffen, Teledesic vice president, says the idea of Teledesic is global in scope. An alliance of companies around the world will fund the project, which Griffen says isn't so out of line with other major telecommunications projects.

"$9 billion is a lot of money," he says, "but not in comparison to telecom revenues."

Some call the idea crazy, but money spent on building Teledesic would be much less than a comparable fiber system. Griffen says he saw one estimate that fiber wiring every home in Japan alone would cost $1 trillion. Coaxial cable, another frequently cited candidate for the broadband infrastructure of tomorrow, has nowhere near the penetration needed.

"If there were 10 million people on cable modems or some similar technology by the year 2000, that would be great," Griffen says. "But there are 6 billion people in the world."

Use of the Teledesic network would vary from country to country, Griffen says. More advanced countries could use it to give broadband data transfer capability to rural communities, while developing areas might use it mainly for voice communications. American city dwellers sometimes forget that the whole world doesn't have the advanced communication capabilities of the United States, and it likely never will.

"There are more phones in Manhattan than in all of Africa," Griffen points out. Teledesic, he says, would help level the playing field. One estimate equates the proposed system to 100,000 T1 lines that could be instantly delivered anywhere in the world, more bandwidth than most of the Earth will ever see from ground lines.

Before the Web became popular, Griffen says, most people didn't understand what Teledesic was about. They assumed it was another scheme to provide phone or direct TV service. As more users experience the 'Net, they begin to comprehend what Teledesic aims to do and how valuable it could be. A fiber system in the sky would give every location in the world the connectivity options available to businesses in New York or Tokyo whenever they need it, at any speed necessary. Future competition will demand this type of two-way, broadband communication, Griffen says.

"You need to be like fiber," he says. "If you deviate from fiber, you risk being bypassed."

With competition bound to heat up between Teledesic and its outer space rivals, wireless networking is set to expand its invisible net around the world. The fastest systems, such as Teledesic, will use antenna dishes that aren't exactly laptop-friendly, but one can imagine public terminals with infrared "pay-ports" offering network time in airports and other locations. Perhaps systems similar to Ricochet will blanket urban areas with broadband radio networks.

The question isn't whether the wires will disappear, but when and how. The desktop is starting to lose another advantage. ●

by Alan Phelps

For More Information:

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'Net Boxes Start To Emerge

It's been rough going for the $500 Internet box idea. Derided by industry analysts and ridiculed by Microsoft CEO Bill Gates in *The New York Times*, the notion that a useful machine can be sold at a price well below $1,000 suffered attacks aplenty from an industry dominated by $1,500-and-up Windows-Intel monsters.

The rain of scorn didn't stop a host of companies from diving into Internet appliance plans of their own. IBM, Olivetti, Oracle, Sun, Apple, and several smaller firms all have announced ongoing projects to build network computers, set-top boxes, 'Net-top boxes, Internet appliances—whatever you want to call them. If the "network computer" is a bad idea, it must be one of the most popular bad ideas in history.

With the results of these efforts just beginning to trickle into the marketplace, the only jury that counts is still out on these stripped-down Internet machines. Despite the general lack of enthusiasm from the pundits, however, 'Net boxes might be the best thing to happen to computers in a long time.

There's a certain appeal to the plans, after all. Before Oracle CEO Larry Ellison announced his company's intentions to build cheap Internet-browsing machines without hard drives or the Windows operating system, most users seemed to have forgotten that $500 once seemed expensive for a home computer. The venerable Commodore 64, a $150 device that by today's standards could do almost nothing, nosed its way into a million American hearts and rec rooms even without the draw of Internet communications.

Computers lining store shelves today sport expensive, cutting-edge components that drip features and drive up the price. These $1,500-and-up machines are designed to run every application in the vast library of existing DOS and Windows programs. Whether you need all that power to simply use E-mail and the World Wide Web doesn't particularly matter. Take your Pentium home and be happy.

Cheaper computers do exist, even at prices less than $500. Getting a machine for that kind of money, however, often means stooping to yesterday's technology. PCs based upon Intel's old 286 and 386 central processing units (CPUs) can handle some Internet jobs, but they are limited by their slow clock speeds and small amounts of memory. Even a 486/25MHz with four megabtyes (MB) of random-access memory (RAM) is ponderous with today's large Web browsers and gigantic operating systems.

On the other hand, used PCs are relatively cheap and plentiful. One company is even marketing refurbished machines as Internet boxes to capitalize on the recent 'Net-top box media blitz. (See the sidebar "PCs Reborn.") While an option for entry-level, would-be computer users, many new owners of old computers are likely to be disappointed. The money spent on used PCs goes mostly to pay for their ability to run programs such as Windows, not necessarily for Internet strength.

More For The Money

There are better ways to make a $500 Internet computer. Thanks to recent developments in specialized, Internet-savvy programming languages such as Java, they might even work.

The obvious method is to take a cue from the sub-$500, cutting-edge systems of today: video game players. The Sony PlayStation, for instance, includes a CPU-like microprocessor nearly as fast as a Pentium, graphics that put most desktops to shame, and a CD-ROM drive—all for less than $300. Slap on a modem or some other communications device, and you've got about all you would need for a decent 'Net box.

Many users might be surprised to learn a mere game machine has enough power to do a job previously handled by $2,000 desktops, but the truth is, it doesn't take a top-of-the-line **Wintel** beast to browse the 'Net. (A Wintel PC is one that contains an Intel microprocessor and the Windows operating system.) Rather than the run-every-Windows-application-ever approach of the Intel-based megadesktop, game machines and future 'Net boxes focus on the less lofty goal of performing one major task. The way to think of these new Internet appliances is not so much as scaled-down PCs as scaled-up TVs, phones, game machines, stereos, and other consumer devices.

The main reason gameplayers and the new "network computers" (NCs) can be built so cheaply is the use of alternative CPUs, such as the PlayStation chip, that are based upon **Reduced Instruction Set Computer (RISC)** designs. RISC chips are designed to be less complicated and more economical than Intel's **Complex Instruction Set Computer (CISC)** approach. RISC basically lets chips deliver speeds comparable to Intel microprocessors at a much lower price. The main problem with these alternative processors up to now has been the fact that they don't do Windows. That limitation doesn't matter for the game machine companies, such as Nintendo and Sega, who follow their own software standards. For the same reason, it also doesn't matter to potential NC makers.

"System manufacturers no longer need to use one architecture," says Gary Meyers, strategic business unit director of LSI Logic, the company that designed the brains of the Sony PlayStation. "The development of the World Wide Web and browser technology basically makes the CPU requirement independent."

LSI's latest project is just the kind of thing that makes 'Net-top producers happy. The "Internet-on-a-Chip" microprocessor includes a high-performance CPU, display and sound drivers, serial and parallel port interfaces, and a v.34-compatible modem—all on a single chip. (V.34 modems offer full-duplex [two signals can be sent at once] transmission at 28.8Kbps.)

ViewCall America's WEBster may be the first 'Net box to hit the market.

The only other components necessary for cobbling together an NC would be a power supply and enclosure; flash read-only memory (ROM) for built-in, upgradable software; maybe 4MB of RAM; and input devices such as a mouse and keyboard. Meyers says the whole thing could be built and sold for less than $300, a price point he thinks would open new doors in the computer market.

"I think once you get to that range, you become accessible to a very large segment of society today," he says.

The Java Buzz

Besides offering cheap access to the 'Net, emerging hardware-independent programming languages such as Java give NCs the potential ability to perform other traditionally PC-centered tasks as well. Designed by Sun Microsystems, Java runs on any machine with a Java-enabled Web browser such as *Netscape Navigator*. Web publishers don't need to worry about writing different programs to work on different computer architectures. Java "applets" travel through the Internet and execute inside the Netscape browser, be it on a Macintosh, PC, Unix box, anything.

Most Java applets now on the Web are small graphical elements designed to spice up layouts, but applets could be written for word processing, spreadsheets, or anything else. NCs could download these applets on an as-needed basis, use them, and delete them from memory. For instance, a user might flip on an NC, download a small editing applet to write a letter, then download a spell-checking applet to proof it. The text could be printed at home or stored on a server anywhere on the 'Net.

Bundle these factors together—machines based upon cheap, new CPUs; the promise of Java; and a healthy dose of Web hype—and you've got a race between computer companies to put out NCs. Oracle was one of the first companies to announce such an effort, and their prototype NC was demonstrated for the first time in February. The device, housed in a stylish 12-inch box, is designed for 'Net surfing, E-mail, word processing, and other low-power tasks. It includes a modem connection, mouse, keyboard, and cables for connecting to monitors or TVs and comes with a small operating system called NCOS. The Oracle NC is expected to hit the market sometime this year.

Fast on Oracle's heels is IBM, which expects to have its Interactive PC ready by the end of the year. As *PC Novice* went to press, Sun Microsystems was testing 300 prototypes of its machine running Java-based applets. Apple Computer already has a sub-$1,000 Internet box called the Pippin being marketed in Japan by toy maker Bandai. (See "Technology News" in this issue.)

A group of smaller competitors is likely to get machines to American consumers first. Lesser-known companies such as Britain's Acorn, which plans to unleash soon a $500 Netsurfer machine, are taking the quick route to market to capitalize on NC momentum. Teknema Inc.'s $500 Easy Rider also is slated to be in production soon, along with the Canadian company TransPhone, which is building a credit-card reading device into its box for online purchasing.

Beating them all to the starting gate is ViewCall America's $300 WEBster. The company is in the midst of a final Atlanta market test before a scheduled roll-out in September.

Alan McKeon, ViewCall America president, says the key element to the home Internet appliance's design is ease of use. For example, setting up the WEBster involves hooking up only three wires: the power cord, the telephone cord to the built-in 28.8 kilobits per second (Kbps) modem, and the wire to the television. An infrared remote, similar to television remotes, controls on-screen movement of the cursor. An infrared keyboard also can be used to type words into Web forms.

McKeon sees the WEBster as less like a computer and more like a VCR—a useful gadget priced below $300 that gets used in the living room, where people spend most of their time.

"The WEBster is designed to fit into that marketplace," he says. "We're not really trying to compete against the PC here. This is a different category." McKeon says comparing 'Net boxes such as the WEBster to full-blown PCs is like comparing Fords to Ferraris. If price didn't matter, most people would go for a Ferrari, he says. When consumers just want something to use on the Web for the lowest price possible, the WEBster makes sense.

The expense of PCs up to now has locked many would-be 'Net users out of the market, McKeon says. He points out that today's computer crowd is heavily skewed toward those who make more than $50,000 a year.

"We don't think it's fair for the average consumer to be denied the resources of the Internet," he says. "We're developing society into a world of haves and have-nots. That wasn't the intention of the Internet."

To make it through the dragnet of disbelievers, the WEBster must answer a few perennial 'Net-top complaints. First off is the fact that televisions make bad, fuzzy displays that don't approach computer standards. McKeon says the WEBster will use software techniques to help make text more legible. What about upgrading the Web browsing software? The WEBster's proprietary browser is stored in flash ROM, which can be erased and rewritten. McKeon says users eventually will be able to download updates from the ViewCall America home page.

While WEBster-like devices fight these types of obstacles to make it in the home scene, more professional NCs could score their first market successes at the workplace. LSI's Meyers says the driving force behind NCs in the near term might not be the Internet, but **intranets**—internal networks using Internet-like interfaces and protocols.

"For the corporation, the intranet terminal will likely be big," Meyers says. Once a company sets up a functioning intranet, the requirement for an x86 PC on every desk goes away, he says. The local-area networks (LANs) in place at thousands of businesses are fast enough to make downloading Java applets just as quick as accessing huge programs on hard drives.

Critics like to bring up the fact that so-called "dumb terminals" used to be common in large businesses, and users favored the desktop PCs that eventually replaced them. True enough, say NC backers, but today's intranets, servers, and terminals are much faster, more user-friendly, and more reliable than the looming mainframes of the past. The bottom line is perhaps the most convincing: Rather than having to purchase $2,000 computers for every employee, an intranet-NC model requires only $500 terminals on each desktop. Instead of buying huge stacks of expensive office software suites, libraries of Java-ish applets could be stored on the central server and used as needed.

"There's going to be a tremendous amount of interest in standardized software and lowering costs," Meyers says. With all software stored on a server, upgrading becomes a simple matter of reconfiguring one computer instead of an entire building-full. The time and expense now spent tweaking complex PCs for each employee or rescuing workers who may have accidentally erased a vital file could largely be eliminated.

One problem with this scenario, however, is that no really useful Java applets yet exist. Meyers calls it a chicken-and-egg question. NCs need Java, but Java developers need an NC market to make it worth their while. Meyers is confident momentum will move Java forward.

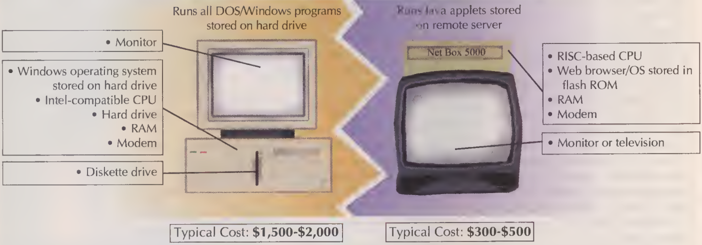
"There are enough Java developers writing today that I think there will be a ripple effect," Meyers says. More and better Java applets will push demand from PCs to NCs, which will increase the incentive for developers to write Java applets.

Slow Down

Though intraoffice networks may have the bandwidth for zipping Java applets about, the specter of low data speeds could limit the chances for home 'Net boxes. With more than 5 million people connecting to America Online at

PC vs. NC

New, so-called "NCs," or network computers, leave behind the generalist approach of PCs in favor of concentrating on one job: browsing the Internet. The result is a cheaper, leaner machine with a certain amount of promise but unknown market appeal.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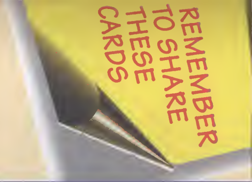

You know better than anyone how frustrating it can be when you need help with your computer and there's no place to turn. *First*, you turned to your computer manuals only to find them full of techno-babble. *Then*, you tried the other computer magazines and found them full of advertising and useless information.

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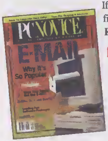

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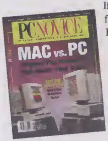

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an average speed of 14.4Kbps, time lags are no strangers to current users. But will watching the Web go slowly by on a television screen wow enough noncomputer users to drive a new market for NCs? In the short term, low bandwidth could present a mighty challenge.

Detractors point to a few other NC problems. An oft-heard complaint charges that users will balk at having to store their data on remote servers rather than internal hard drives. Of course, the only data most home users with narrowband connections are likely to generate is E-mail, something many people store on remote server computers already.

Experience in offices with fast LANs shows that as network speeds increase, physical file locations lose importance. How fast you can retrieve something is much more important than where you find it, and no one doubts home access speeds are set to rise dramatically. Even Bill Gates, sworn enemy of the $500 computer idea (for now), predicts unlimited bandwidth will be widely available within a decade. Telephone companies are hard at work testing a new way of pumping megabits per second through ordinary phone lines, and the partly Gates-backed Teledesic satellite system aims to create a broadband network in the sky by the year 2002. (See "Wireless Computing Increases The Price Of Freedom" in this issue.)

With enough bandwidth available, downloadable Java applets become feasible. In the meantime, home NCs will need to survive in a narrowband world by sailing the sea of Internet hysteria and emphasizing slow-speed activities such as E-mail. Manufacturers are banking on the belief that people who aren't willing to spend $2,000 to send E-mail to their family might be willing to plunk down $200 or $300.

Another growing lowband, NC-friendly area is home banking. Today's modem-equipped computers can, with the right software, transfer money, pay bills, and update home finance programs online. It's a convenient resource currently available only to those able to buy an entire computer but easily adapted to the NC world.

One obvious, but less-frequently mentioned, market for cheap Internet boxes are schools. Faced with the opposing forces of severe budget limitations and the growing realization that kids need computer experience, many educators could see cheap NCs as a potential solution. A tremendous amount of tomorrow's fact-gathering will be done online, and students at schools without adequate access to the 'Net may fall behind. Inexpensive student 'Net boxes might not be as great as individual student PCs, but as Web access becomes more and more the central focus of computers, that difference will fade.

Even with the potential from specialized markets, today's narrowband connections might make the NC an idea slightly ahead of its time. Whatever niche NCs carve is likely to be taken over eventually by Internet-enabled versions of more familiar appliances such as the television and telephone. For now, they will serve an unknown number of people who desire Internet access but are unwilling or unable to pay the full price of a computer.

In the corporate realm, NCs stand a better chance as long as Java lives up to its billing. A machine that can't do anything isn't worth anything, and right now, the lack of Java apps means NCs are useless. Undoubtedly that will change, but the inertia of the Wintel years will make marketing NCs an uphill battle.

No one should claim to divine the future of such a wacky field as computers, but the NC shows promise. The bandwagon is loaded up and heading out, secure in the belief that long-term trends are undeniably network-centric. As access speeds rise, the innards of individual computers begin to matter much less than how many computers can be tied together. The Internet terminal may be the device of the future, but it remains to be seen how many consumers are ready for the future to begin now. ●

by Alan Phelps

For More Information:

ViewCall America
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PCs Reborn

Everyone's hoping to ride the wave of publicity surrounding the $500 Internet computer idea. While most of the players in this emerging market are busy designing and testing brand-new machines built around custom CPUs and running new software, another approach might be to pick up the discarded PCs we already have.

Reply, a computer upgrade company in San Jose, Calif., buys old computers from large companies, refurbishes them, and sells them to new users with a one-year warranty. In an apparent effort to grab new publicity for what would otherwise be just a bunch of old computers, all Reply machines include modems, Internet software, and colorful names such as Web Sprinter and Web Wizard.

While the monikers may be amusing, the prices are fairly reasonable, especially when you consider that the machines come with the warranty and an upgrade guarantee: Anyone who decides to trade up to a better Reply model within one year can apply the full purchase price of the first machine toward the second (some restrictions apply, of course).

The cheapest refurbished computer is the $299 Internet Trekker, a 286-based DOS computer with 1MB of RAM, a 40MB hard drive, and a 9600bps modem. The Trekker probably isn't the best buy for people interested in using the Internet, though. The best parts of today's 'Net, like the World Wide Web, are graphical. DOS is not. In the below-$300 price range, it might be better just to try out an Internet appliance such as ViewCall America's WEBster. (See main article.)

Those with a little more cash could try a $400 386-based model with a 14.4Kbps modem, a $500 486/25MHz machine, or the $800 486/50MHz Web Master. The ultimate Web Wizard gives you a 586/100MHz processor for $1,000. From a strictly Internet standpoint, none of these machines will give users the kind of performance/cost ratio that most upcoming 'Net boxes promise, but they will let you run Windows software. Despite the marketing department names, that is probably their biggest strength.

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These four manufacturers accounted for nearly half of all portable computers sold in 1995. This means that many people probably have a lot of questions to ask these companies about their fine products. It also means that a lot of people are probably calling technical support right now. Rather than wasting your valuable time on hold, spend it more productively online. Each of these sites offers product information, downloadable drivers, answers to frequently asked questions (FAQs), and other beneficial goodies for owners of Toshiba/NEC/Compaq/IBM laptops.

Laptop Central

http://www.suba.com/~epbrown

Just as a picture is worth a thousand words, a single unbiased product review is worth a thousand press releases. Realizing this truth, Laptop Central invites current laptop users to share their unadulterated knowledge of portable computers with prospective laptop users. Some reviews are long; some are short. But all express each author's satisfaction or dissatisfaction with various types of portable computers. Visitors also can browse through a list of laptop FAQs, link to PC manufacturers and related portable sites, and read some laptop buying tips.

Fringe Ryder's Corral

http://www.fringeweb.com

The politically astute portable computer user will enjoy a romp in Fringe Ryder's Corral. First, brush up on your portable computer knowledge by checking out Ryder's views on some of the lesser-known laptop manufacturers and resellers (including Dolch Computer Systems, which sells the NotePAK, an all-terrain laptop capable of withstanding 20G shock). Then look at the issues by reading his essays about welfare, affirmative action, abortion, and crime.

Fourth Of July Site

http://banzai.neosoft.com/citylink/usa

Celebrate the 220th birthday of the United States of America by blowing off some fireworks, firing up the barbecue, slicing open a watermelon, and spending some time at this red, white, and blue holiday site. Read copies of the Declaration of Independence, the U.S. Constitution, the Pledge of Allegiance, the inauguration speeches of past presidents, and Francis Scott Key's famous poem, "The Defense of Fort McHenry" (better known as "The Star-Spangled Banner"). Links to key government sites and a fireworks safety test also are included here.

Reunions Magazine

http://www.execpc.com/~reunions

'Tis the season for reunions, and *Reunions Magazine* offers helpful advice for planning and pulling off a successful gathering. A handful of informative and inspirational columns by reunion experts accompanies an extensive listing of reunion-related classified ads and a directory of potential places to hold the big event. Look here for help in adoption-related searches, too. Finally, you also can view back issues, order a hard-copy subscription to the quarterly magazine, and link to related sites.

Leonard's Cam World

http://jax.jaxnet.com/~len/camera.html

Thanks to video technology and the Internet, you may never again have to pollute a letter or telephone conversation with that dreadfully trite phrase, "How's the weather?" Leonard's Cam World gives you the chance to answer that question yourself by providing access to more than 150 live video cameras from around the world. Tune in to see the sun rise over Antarctica, then watch it set on San Francisco Bay. Most pictures are updated every 15 to 30 minutes throughout the day. For those who want to verify what they see, most of the cam sites include links to corresponding meteorological data.

JewishGen

http://www.jewishgen.org

Adam begat Seth, who begat Enos, who begat Cainan, who begat Mahalaleel, who begat Jared, who begat Enoch, who begat Methuselah, etc. Since the biblical beginning of humankind, the Jewish people have carefully recorded their ancestral lineage. While antediluvian Jews preserved their genealogical history in the Torah, modern Jews now can go online to JewishGen to search for ancestral information, then post their findings for others to review. All genealogists, particularly those of Jewish descent, will enjoy searching for information about relatives, looking up Web sites of other Jewish genealogists, browsing through the numerous InfoFiles full of helpful research advice, and discovering the vast collection of on- and offline resources available for Jewish genealogists.

The JewishGen site was recommended by reader James Gross of Haddonfield, N.J. If you have a favorite online site you'd like to share with fellow readers, send it to:

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Lincoln, NE 68501 ●

by Jeff Dodd

You're Not Alone

Joining Forces With A Computer User Group

They were once pioneers proudly staking claims on the cutting edge of technology. Now, after investing considerable time and money in their PCs, older-model computer users feel like the last residents of a ghost town, abandoned by technology they helped pioneer. Fortunately, computer user groups let these holdovers escape the Pentium frenzy and help each other wring a little more value from their aging, but still able-bodied, PCs.

A **user group** is an organized band of individuals who share an interest in a particular computer, operating system, software application, or peripheral. Most user groups hold monthly or semimonthly meetings, offer occasional presentations by industry experts, regularly send out informative newsletters, and maintain software libraries for members. Some groups also offer free Internet access and E-mail accounts to dues-paying members.

■ Why User Groups?

Although user groups are popular with all kinds of computer users, they have a special appeal among users of older PCs. They're popular with these folks mainly because they offer technical assistance, general product information, and compatible software that users of older computers have difficulty obtaining from manufacturers and retailers.

Asking a manufacturer or retailer about older model hardware and software is like interrogating politicians about the latest scandal. Real answers are rarely forthcoming. For one thing, most manufacturers prefer to promote their latest products rather than give advice about earlier versions. To be blunt, they don't want to waste their time on technological anachronisms. Furthermore, the adolescent sales clerk at the local computer store probably has never seen a PC without a 3.5-inch diskette drive, much less studied older products. Finally, some of the original computer hardware and software manufacturers have gone out of business or been purchased by larger companies.

User groups don't rely on technical experts, toll-free support lines, or other industry resources to solve problems. They depend upon members to provide technical information and advice. After all, who better to consult about a product than hundreds of other users? Users will discuss the intricacies of their own systems because they will ultimately benefit from the conversation. They also tend to be more reliable and less biased than the marketing cheerleaders hired by manufacturers.

User groups offer more than just information, though. "The best advantage is that you are not alone with your problems, questions, or concerns," says Ron Whittam, a member of the Atari Boise User Group (ABUG) and creator of ABUG's World Wide Web page. Because of the lack of technical support and the constant flow of new technology into the marketplace, many users of older computers feel isolated from the rest of the industry. User groups prove that a lot of other people still use older PCs. They also give users the chance to share their own wisdom and experience with others. "It's a great sense of community," Whittam says.

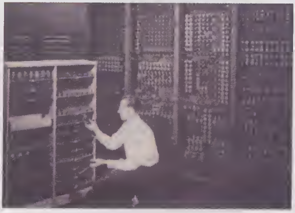
And a great sense of loyalty. Members of older model user groups are often intensely faithful to their old standby PCs, Whittam says. "A lot of this mentality comes from spending a lot of money on a system that works well and not being willing to spend any more on new systems."

Kevin Dunn, secretary/treasurer of the Fort Collins Commodore Computer Club, offers an analogy to explain this loyalty: "It's kind of like having a '57 Chevy. They will never make them again, but does that mean we should throw them in the landfill? Hell no!" This die-hard loyalty manifests itself in the enthusiasm group members express in providing technical support and advice to other users.

User groups advertise anywhere computers are a common topic of conversation. Ask any local PC expert for information about user groups or call manufacturers for information

Memory Lane

The first truly electronic computer system could be called a "home PC," not because it was suited to the home but because it was the size of the home. The ENIAC (Electronic Numerical Integrator And Computer) took up 1,500 square feet—roughly the size of a small house. The system, developed by a team led by John Mauchly & J. Presper Eckert at Moore School of the University of Pennsylvania, was designed for the U.S. Army in 1946. ENIAC could perform all basic mathematical functions: addition, subtraction, multiplication, division, and computation of square roots of numbers expressed in decimal form. The system's speed was expressed in terms of the number of mathematical operations it could execute in a second: 5,000.



U.S. ARMY PHOTO

Replacing one of ENIAC's vacuum tubes meant checking among 19,000 possibilities.

The ENIAC was the most complex vacuum tube computer ever built, a fact that contributed to the machine's vast size. **Vacuum tubes** harness the power of the attraction of unlike electrical charges and repulsion of like charges, letting a small charge control the flow of electrons through the vacuum inside the tube.

Many older systems didn't use keyboards and monitors for the input and output of processed information. The ENIAC used punch cards as both the input and output device, creating another step for the human element in the computation process. ○

about a group in your area. Also, check local computer stores for bulletins advertising the groups or browse the computer section of a library for old copies of user-group newsletters. An online search for "computer user groups" uncovers hundreds of possibilities. Although most user groups are organized according to geographic regions, some maintain Internet sites to accommodate members worldwide.

Some larger user groups are divided into **special interest groups** (SIGs), which focus on a particular aspect of a broad topic. Ask large PC user groups whether they offer an older computer SIG. If you live in a metropolitan area, it should be easy to find a nearby user group to suit your needs. Note that most user groups charge their members annual dues to cover the costs of publishing a newsletter, holding monthly meetings, sponsoring guest speakers, and providing free software. Dues can range from $10 to $80 per year but generally average between $25 and $40 per year.

Why Not Start Your Own?

If you can't find a user group in your area, it's easy to start one. You don't have to be an expert to found a user group; you just have to find people who share a common interest. ABUG's Whittam suggests looking first in local bookstores to determine whether other users are around. A bookstore that carries magazines or books aimed at users of older computers must have a local audience. Advertise in bookstores, grocery stores, computer retailers, classified ads, and local **bulletin board services (BBS)**. (A BBS is an online area reserved for posting messages and information. You can get the numbers for local BBSes from most local computer stores.)

After you've found interested people, organize a meeting and decide what you want to accomplish. "Be prepared to spend some long hours getting started," Dunn says. "Also, don't try to do it all yourself."

Call other user groups for assistance and look for help from computer experts at nearby universities and area businesses. Remember: The success of user groups depends upon people getting involved and sharing their computer knowledge with others. A user group is only as informative and valuable as its members allow it to be. ●

by Jeff Dodd

For More Information:

Atari Boise User Group
http://www.primenet.com/~whittam/atari.html

Boston Computer Society
(617) 290-5700
http://www.bcs.org

Fort Collins Commodore Computer Club
(970) 221-4894

Resources for User Group Officers
http://www.melbpc.org.au/others/resource.htm

User Group Connection
(408) 477-4277
http://www.ugconnection.org

From Our Readers...

Dear PC Novice:

I am looking for two manuals: Hazeltine 1510 model 4DTD155207 and ProModem #300/1200. I called Hazeltine Corp., but they told me the products were obsolete and the manuals were no longer available. Do you have any suggestions?

Jose Varas/Union City, NJ

The lure of low-cost used computer hardware and software products sometimes leads to a frustrating end. When a system that's adequate for your needs is dropped into your lap, you probably won't quibble over missing paperwork. However, without the manuals to help you get acquainted with the new-to-you product, you may feel it's not worth the pennies you paid. To complicate matters, no one, including manufacturers, produces manuals for some older products anymore.

If you purchase an older system at a garage sale, be sure to ask for all the manuals. If the manuals aren't with the system, dig through surrounding boxes of books. They may be mixed in with something else that is also up for sale.

There are a few possibilities for finding missing manuals. Try contacting the company that produces the item; it might be able to provide a manual. If the missing manual accompanied a product from years ago, the books may be unavailable, even from the company. Look in local used bookstores. Those that carry a variety of books may find a manual similar to the one you need or a book that provides tutorial information on your product.

There are a few more options if you have an online connection. Look for manuals or related books in the online bookstores at the Nerd World Media site (http://www.nerdworld.com/nw583.html). The exact manual may be difficult to find, but these sites could help you find a related book that will provide enough information to get you started. One bookstore that doesn't carry manuals, but does carry out-of-print titles, is Bookworks (212/385-1616). Bookworks says it might be able to help find books on Hazeltine and Promodem. They won't be the manuals you're looking for, but they may serve as a reasonable substitute. It carries general computer books including tutorials, which may prove helpful.

Contacting user groups is another option for online users. In the group **rec.arts.books.marketplace**, you can post requests for books, and other group readers will respond with any offerings they can provide.

None of these options guarantees finding exactly what you're looking for. The only sure bet is to make sure that any necessary manuals accompany the system you purchase. You may decide the effort of locating a manual isn't worth the money you save on a used system.

Send questions about old computers to:
Your Old PC
c/o PC Novice
P.O. Box 85380
Lincoln, NE 68501 (Volume prohibits individual replies.)

You *Can* Take It With You

You're on a red-eye flight to New York. You're thumping the keys of your ThinkPad, desperately trying to finish up the monster presentation you have to give in less than five hours. You go to the File menu and try to click Print. Wait—you're not at your desk; you're using your portable. You can't print this out on the plane. Or can you?

Some of the latest trends in mobile computing have been toward upsizing notebooks and other portable PCs for better performance, but most of the peripherals for these portable products have continued to shrink in size and in price.

This means that you don't have to give up all those extra technological perks you have grown accustomed to having on hand just because you're riding on a Boeing 777 or hiking through Yellowstone National Park. Almost anything you can do on a desktop, you can do just as well, if not better, from a portable computer. Here's a list of 10 products that might help transform your barren laptop into the perfect on-the-go computer.

1 Need A Hard Copy?

If you are making those last-minute adjustments to your board presentation while on the plane, a portable printer ensures that you'll have the latest version of your notes in hand before you land. Portable printers aren't on the same level of quality as their desktop cousins, but their convenience and compactness more than make up for the lower level of resolution.

The Canon BJC-70 has a list price of $399, weighs in at 3 pounds, and measures approximately 12-inches long x 6-inches wide x 2-inches deep when closed. The Canon's lid functions as a 30-page sheet feeder when opened, and the color inkjet unit puts out nearly four pages a minute. (*NOTE: Next month, PC Novice will focus on printing with a feature article on the top portable printers.*)

2 CD-ROM On The Road

Another piece of traveling hardware is the portable CD-ROM drive. Useful for reading data CD-ROMs and for providing a full multimedia presentation, CD-ROMs also are just plain fun for games and listening to music.

The CARDport CD-ROM drive from CNF features Plug-and-Play connectivity, four separate power source options, and low power draw. The 1-pound unit will cost you about $339 and also can function as a standalone audio CD player. CD-ROMs are almost impossible to get along without at home or in the office; why should it be any different on the road?

3 E-mail At The End Of The Earth

Traveling can be exciting and adventurous, but it also can be lonely. You've always been able to stay in touch with the rest of the world by getting your portable hooked up to the Internet via fax/modem. But say you're hiking across the Appalachians and realize you forgot to update a report back at the office. What do you do without access to a phone line?

Here's one answer: The AirGo Phone System, which integrates a cellular radio and a 14.4 data/fax modem into one PC Card. The Phone System functions in Macintosh or IBM-compatible laptops, notebooks, and personal digital assistants (PDAs). It lets you place and receive voice calls, send and receive E-mail, or fax wirelessly via the built-in swivel antenna.

Other modems can hook up to your cellular phone, but the Phone System, while a bit pricey at just less than $1,000, is the first to truly make your portable cellular-capable.

4 Sending Files Back Home

Wireless or landline, your modem connection gives you a link back home; now you just need a file transfer program to update the report that's filed away in your desktop.

Traveling Software's *Laplink for Windows 95* lets you transfer files remotely (unfortunately, often at slow speeds). Laplink's newest version costs about $140 and includes remote control of your desktop over a variety of media: phone lines, networks, and even infrared (IR) links, and works on both Windows 3.1 and Win95. Laplink shows that keeping in touch is one thing; keeping control is another.

5 Finding Your Place In The World

What if you miss that left turn at Albuquerque and can't make your way back home or even to the nearest gas station? If money's no object, consider taking advantage of the U.S. Department of Defense's Global Positioning System (GPS) to let you know where you're at—anytime, anyplace.

The Mobile GPS modem from Trimble can help you take advantage of this $13-billion, satellite-based navigation system. The Plug-and-Play sensor will give you a position accurate to within 100 feet for the lower-priced model (about $600) and within 7 to 18 feet for the higher-priced system (about $1,600). However, in order to really take advantage of this technology, you'll need to purchase mapping software to go with the modem. If there is no "You Are Here" sign where you are going, now you can bring your own. (For more information on GPS, see "5 Things That Make You Go Wow!" in this issue.)

6 Sign Here, Please

If you're a traveling salesperson or another mobile professional, you might find it useful to obtain signatures in the field, then be able to immediately fax or modem them back to the office.

A portable version of the PenWare 100 signature pad is available for just this purpose. The battery-operated, pressure-sensitive pad costs around $375 and captures signatures and other handwritten information, then transfers it into a desktop or portable PC.

The trend for many portables and PDAs is in handwriting-recognition software. While the PenWare 100 only transfers the writing and does not allow for editing or other processing aspects, you might say it's a step in the *write* direction.

7 Game On

OK. Maybe all this traveling is really stressing you out, and you just need to take a break. If there were only some way you could bring along your new *Cyberthug* game without feeling robbed of the satisfying interaction and sound you get at your desktop.

Well, New Media Corp.'s GAMEjammer PC Card features a built-in speaker and a joystick port, freeing you from headphones or external speakers. The sound emanates from inside the machine as you clutch the joystick and open fire on your nearest enemy.

GAMEjammer will run you about $150 and also features Zero Consumption Advanced Power Management (APM), which lets users leave the PC Card in the slot and not have to worry about it sucking the battery life out of their portable.

8 Plug It In

Even with your GAMEjammer's Zero Consumption APM, it won't be long before your battery-powered portable goes dead out on the road.

With Xtend's Microbolt DC Auto Adapter, you can run or recharge your notebook and other peripherals from any 12-volt DC power source. Plug the $99 adapter into the cigarette lighter of your car, boat, or RV, and you're powered up.

Each adapter is smaller than a pack of cigarettes, weighs only 5 ounces, and is individually designed for the specifications of your computer.

9 Leaf It On Your Lap

And last but not least come peripherals that deal with the comfort and convenience aspects of portables. After all, convenience is what portable computing is all about.

One of the biggest complaints users have about portable computers (besides the tiny keyboards) is how to hold it when away from a table or other flat surface.

MaBron Companies has come up with the LapLeaf, which is an extendable plastic worksurface that costs roughly $30 and allows a notebook user to sit in a more relaxed manner and not worry about their computer tumbling to the floor.

The LapLeaf provides a stable surface for a portable (with Velcro attachment) and, after the extensions are pulled out, gives the user room for writing space or a mouse.

10 Draw!

Most PDAs and other handheld devices are too large to fit in a pocket but are still small enough to be easily misplaced. This makes them a pain to lug around just so you can have them where you actually need them.

Enter the Pocket Liberator Holster System from Opus 63. This company has rediscovered what gunslingers of the Old West knew for fact: It always is more efficient to keep the tools of your trade close at hand.

The palmtop holsters come in a variety of sizes, styles, and prices ($48 to $70) and hold PDAs, cellular phones, and pagers.

Back to that flight: You move your mouse across the LapLeaf and point and click Print. A few seconds later, a revised version of your presentation notes pops out of your Canon BJC-70. You E-mail ahead to New York, confident that you'll be ready to deliver your presentation on schedule. ●

by Joel Strauch

For More Information:

AirGo Phone System
AirGo Communications Inc.
(801) 269-7200
http://www.dayna.com

Canon BJC-70
Canon Computer Systems Inc.
(800) 423-2366
(714) 438-3391
http://www.usa.canon.com

CARDport
CNF Inc.
(800) 826-3462
(408) 778-1160
http://www.cnfinc.com

LapLeaf
MaBron Companies
(800) 836-0607
(214) 480-8686
http://www.lapleaf.com

GAMEjammer PC Card
New Media Corp.
(800) 453-0550
(714) 453-0100

Pocket Liberator Holster System
Opus 63 Design Lab Inc.
(800) 588-6787
(718) 706-6787
http://www.opus63.com

PenWare 100
PenWare Inc.
(415) 858-4920

Laplink For Windows 95
Traveling Software Inc.
(800) 343-8088
(206) 483-8088

Mobile GPS
Trimble Navigation Ltd.
(800) 865-4850
(408) 481-8522

Microbolt DC Auto Adapter
Xtend Micro Products Inc.
(800) 232-9836
(714) 699-1400
http://www.xmpi.com

Need help with your hardware or software?

Looking for simple explanations on technical subjects?

Send us your questions!

DOS COMPUTING

Q: *My computer has MS-DOS 6.20. I found an upgrade "step up" kit for MS-DOS 6.22 today, and it was mighty cheap. But all the features mentioned on the box are things I recognize I already have. Do I need this upgrade?*

A: Almost certainly not. The main differences between MS-DOS 6.00 and 6.20 are that the disk compressor (DoubleSpace) and the disk cache (SmartDrive) were made safer and that diskettes could be copied in a "single pass." The main changes from MS-DOS 6.20 to 6.21 were really a *downgrade* because Microsoft was forced by a lawsuit to remove the disk compressor and the compression ability of the built-in backup software. The change from MS-DOS 6.21 to 6.22 was basically just putting back in, in legal form, the compression program (now called DriveSpace).

Therefore, if you have MS-DOS 6.20, you have essentially nothing to gain by upgrading to 6.22. Folks owning MS-DOS 6.21 and wanting a disk compressor, or who use the built-in backup software, need the 6.22 "step up" kit. For those people with MS-DOS 6.00, an upgrade to 6.20 or 6.22 (but NOT 6.21) may be worthwhile.

WINDOWS 3.1

Q: *Windows for Workgroups 3.11 makes provisions for people on a small network to share a single fax board that's installed on one of the networked computers. It doesn't provide, however, a way to share a modem (say for connecting to America Online). Is there any way to do that, or will all four of us have to buy separate modems?*

A: Windows 95, when connected to a network, makes similar fax-sharing provisions, but even this newer system still doesn't offer modem-sharing provisions. You could buy a single external modem and snake an octopus of serial cables and switch boxes into it from each computer's serial port. There are also special sharable network modems with their own software. These will do what you want, but at their prices, you could buy four separate modems and have less complexity.

There are, however, two software-only products that will do what you have in mind (on almost any network), using off-the-shelf, cheap internal modems: One is *INSYNC ModemShare* (Artisoft, 800/846-9726, 520/670-7000, $130), and the other is *WINPort* (LANSource Technologies Inc., 800/661-5267, 416/535-3555, $200). ModemShare is more robust and even will let eight users share a "pool" of three modems scattered among several computers. All three modems can run at the same time.

Q: *When I start File Manager, I see the following error message: "Cannot read from drive I." What causes this?*

A: Sometimes an MS-DOS version 4.x file named Graphics.com might cause this. If you choose OK when you get that error message, File Manager displays all of your drives, but it can't access any of your files. In your Autoexec.bat, try removing the line mentioning Graphics.com. In MS-DOS version 5.0 or newer, the Graphics.com file doesn't cause this problem.

WINDOWS 95

Q: *I know you've run articles about setting the cache size for DOS and Windows for Workgroups 3.11. But what is Microsoft's word on cache size for Win95? What are the optimum cache sizes if I have 8, 16, or 32MB of RAM?*

A: This isn't a feature needing manual "tweaking" with Win95. Win95 manages its disk cache dynamically, meaning it adjusts the size as needed. It makes setting some optimal compromise (between stealing RAM from programs and allocating it to a cache for disk performance as used to happen with the SmartDrive disk cache) less important, and there is no permanent swap file as in Windows 3.1. You can limit the size of its swap file if you want, but on most systems, it works best if you let Win95 take care of it.

UTILITIES

Q: *Though Norton Utilities Disk Doctor and its Speed Disk work, when I try to run Norton's more thorough disk maintenance utility Calibrate, I get the message, "Disk Mapping Problems Found. Calibrate has determined that the disk mapping for this drive has problems. Calibrate will not run on this drive." Does my computer have a problem? I sent it in for repairs, but the technician didn't find anything wrong. Is this serious?*

UTILITIES (CONT.)

A: It's probably not serious in the sense that you're not in immediate danger of losing data. Anything that bad probably would show some symptoms in Norton Disk Doctor or DOS' ScanDisk. We're inclined to suspect that you have something such as Disk Manager or EZ-Drive—disk driver software sometimes installed to get newer disks to work on older computers—running on your system. If so, call the maker and ask them if there's some way to remove it, or at least to get a newer version.

The other solution pertains to the fact that Calibrate may not like running when DOS' SmartDrive is running. Try holding down the F5 key after you see the "Starting MS-DOS" message to create a clean boot before running Calibrate.

COMPUTER HARDWARE

Q: *When I switch from "full screen" to "windowed" display (by pressing ALT-ENTER when running a DOS application under Windows), my monitor makes a squealing sound. Is there a way for me to fix this?*

A: We'd bet that the squeal originates in the monitor. The easy way to tell is just to turn the monitor power off and see if the squeal goes away. If that does it, try using some other screen resolution that can change the horizontal frequency slightly, maybe just enough to kill the noise. If that doesn't work, you might try moving the video card to another slot on the motherboard.

Q: *I have a Pentium 75, which was a hot computer not that long ago. Now there are Pentium 166s out there, and after seeing one in action, my 75 seems a bit slow for video processing and playback. I noticed that Intel now sells a 125MHz Pentium OverDrive processor for $399 that's intended specifically to upgrade my system to a 125MHz Pentium. But can't I just go out and purchase a Pentium 120MHz or 133MHz CPU (which sell for only $260 and $330, respectively, in my city) and save some bucks? Why do I have to get an official "overdrive?"*

A: First off, the OverDrive (OD) price you quoted is a list price, while the CPU prices you compared it to are street prices. The OD prices on the street may not be quite as high as the list price. The whole issue of "what's the difference between an ordinary CPU" and an "OverDrive CPU" is admittedly a bit confusing.

In some cases, the two are interchangeable, and in those cases, save the bucks and get the CPU. There are several reasons why one might have to use an OD rather than a CPU. First, the voltage ratings of the CPU you want are different from those on your motherboard. Second, the old CPU is soldered in, and you have to use the auxiliary overdrive socket to plug in the OD without removing your old CPU.

Third, "official" overdrives may better tolerate voltages being irregular (as sometimes occurs in older motherboards). Check your documentation. If you have a newer board that accepts a regular Pentium rated at 100MHz, 120MHz, or 133MHz, then by all means, buy the CPU. The Pentium OD upgrades are just a reasonable upgrade route for folks with 60MHz, 66MHz, 75MHz, and 90MHz Pentium systems that won't accept faster Pentium CPUs. Unlike when upgrading an old 486's CPU using a Pentium OD, chances are good that your machine has a hard drive, RAM, and other parts that are well-matched to a faster Pentium OD or CPU.

Q: *What is video card RAM, and how much do I need? Cards seem to come with different amounts.*

A: All kinds of technical talk revolves around the RAM in video cards, but the basic thing to know is that the total amount of RAM on the card will affect both the highest resolution and the highest number of colors the card will accept. For business/home use, a video card with 1MB of RAM may be enough. For fancy colored graphics, 2MB of video card RAM is usually plenty. There's one case where the amount of RAM on a video card will affect the speed of your graphics: If you have a 64-bit graphics card and it doesn't have a full 2MB of RAM, it may be unable to run the fast 64-bit mode and will perform slower. Ditto for an expensive 128-bit video card hobbled by having less than 4MB.

Q: *After I outgrew my 80MB hard drive, I had a second 850MB hard drive installed. But now several of my programs on CD-ROM won't work. They worked perfectly before the second drive was installed. What's the problem?*

A: Your problem is one of several that can surface after installing a second hard drive. Because of these problems, we often suggest that when installing a new hard drive, you just sell or give away the old one, not keep it in the computer.

It's likely that before you had the second hard drive installed, your computer knew that your hard drive was called C: and your CD-ROM drive was called D:. After the second drive was installed, it most likely grabbed the name D: for itself, forcing the CD-ROM drive to call itself E:. When you install a program from a CD-ROM, it often installs only its startup files onto your hard drive but still needs you to insert the CD-ROM when you actually run the program. The problem is, most of the startup files probably still "remember" that your CD-ROM drive is supposed to be D: so they can't actually find the CD-ROM drive in E: when they need to.

COMPUTER HARDWARE (cont.)

So what can you do now (assuming you won't remove the 80MB hard drive)? You could call the maker of each malfunctioning CD-ROM program and get instructions as to how to "tell" it to look for the CD-ROM drive on E: and not D:. Or, you could try re-installing the orphaned CD-ROM programs and during the re-install, they'd probably discover where the CD-ROM drive is *really* located.

ONLINE COMMUNICATIONS

Q: *How can I tell how fast a connection I'm really getting when I connect to an online service that claims their dial-in modem will run at 28.8Kbps? I have a US Robotics Sportster 28.8 modem.*

A: Last month, we mentioned a few ways to do that. With your particular modem, there's one other neat trick. Go into the Windows Terminal program (found in your Accessories group) or into any other basic DOS or Windows communications/terminal program. Once there, inside the blank Typing/Viewing area of the screen, type the special modem command **ATI6** (in all caps) and press ENTER. The US Robotics modem diagnostic will spit out all kinds of interesting technical information including something like "Speed 26400." This means the last time you used the modem online, it connected at 26.4Kbps speed. Other modem brands may have similar diagnostic commands. Here's another reason you should read that manual you shoved into the filing cabinet!

Q: *I need to link my home PC (a Pentium 90) to the main office to update files and send in feedback. Is there a software product I can use to transfer files and such? I've tried to get Win95's Remote Access Service (RAS) feature to work, but it's too tricky for me.*

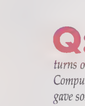
A: First, there's really no software-only solution. At a minimum, you'll need either a 14.4Kbps or 28.8Kbps modem at both ends. Second, RAS (in Win95 or Windows for Workgroups 3.11) works just fine, but we admit that initially getting it set up right can be tricky, particularly on the office end. RAS works best when you're using programs that reside on your home PC to access data on the office PC.

On the other hand, when you're accessing programs that reside on the office PC, remote control software will outperform RAS. This software lets your home PC take control of your office PC as if you were sitting right there at your office keyboard and screen. It usually transmits only the screens rather than trying to move large programs over phone lines. One downside to this approach is that, unlike with RAS, each person calling in to the office completely takes control of one office computer, and no one in the office can use that computer as long as the telecommuter has it under remote control.

There are two powerful remote control software packages specifically for Win95: *pcANYWHERE32* by Symantec and *Laplink for Windows 95* by Traveling Software. *CoSession Remote* from Artisoft isn't specifically optimized for Win95 but will work nicely with it and is lower priced. (For more information on remote control software, see "Be Two Places At Once With Remote Computing" in this issue.)

Q: *I used the PC File Finder on CompuServe (CIS) to try to locate a file in some unknown forum and failed. It turns out the file was actually there, but File Finder didn't find it. CompuServe customer service first said that was impossible, then gave some explanation that I didn't understand. What's the story?*

A: CIS has several different file finders that search different topics/forums. These are great when friends tell you they got a neat utility from CompuServe, but they can't remember *where* on CIS they found it. These file finders let you locate files even when you only know part of the name, or maybe, what they're meant to do. The PC File Finder, however, only searches forums judged to be specifically related to personal computers, so it could easily miss a file that was, say, only on an art-related forum. There's also a Windows File Finder. We're not saying a file can't be found by, say, both the Windows File Finder and the PC File Finder, but you should check out all the types of file finders before giving up and assuming the file isn't on CIS.



PRINTERS

Q: *I was having problems getting my printer to print good-looking photos that I work with in CorelDRAW. I know the printer is capable of more accurate color and resolution than I'm getting. I called the printer maker, and the answer was way over my head. The technician said my problem was one of printer calibration . . . I don't have the scanner, monitor, and printer separately calibrated to get the best results. I'm confused; I browse the messages in the Graphics user areas of the Internet, and I have no idea what these people are talking about.*

A: Calibrators are programs that are designed to compensate for the differences in electronics in the different components you're using to work with pictures. In other words, a picture might look great on your monitor, but when you print it, the colors are off. That's one type of calibration—to get the monitor and printer in sync. There's also the issue that even with the same model scanner, there are

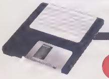
PRINTERS (cont.)

differences between units; each has unique characteristics that must be adjusted so that each feeds information to your computer that's as close as possible to the original material being scanned.

Simple calibration kits work like this: Calibration software in its simplest form comes with an image on-screen (disk) and a matching "calibration card" with that same factory-calibrated image printed on the card exactly as it should print. You adjust your screen colors with the monitor's own color controls so that the image on-screen looks as close as possible to the image on the card. Then you adjust the printer controls (and software drivers for your printer) to try to get the printed image to look as close as possible to the card's. In some calibration software, many of these printer and monitor color adjustments can be made right from the calibration software itself. Once you get it right, if the phase of the moon and your aura don't disturb your finely tuned calibration, you should be all set, unless you change your printer, printer drivers, monitor adjustments, or graphics software again.

Q: *I've heard that the Windows Printing System from Microsoft can radically speed up printing on older HP-II printers. My HP-II prints slowly from Windows for Workgroups 3.11 so I was interested in that product, but the $109 price I was quoted for the product seems a bit high for a software fix. It is software, isn't it?*

A: This kit is, as the $109 price hints, a combination of hardware and software. What may have been a bit confusing to you is that now there are several new printers on the market that also use the Windows Printing System; on those machines, that feature appears to be just software. But in those newer machines, the needed hardware is already built into the printer. The system provides many convenient features and, in some cases, can indeed speed printing fivefold (typically twofold if you're printing only text). The kit's hardware is a simple plug-in module that just pops right into the Font Cartridge Slot on your HP-II or any HP-III. Since that kit isn't a fast-moving item, you may be able to find a vendor, or another user, who'd be happy to sell one for much less than $109. There may be other ways you can speed up your printing, but, to suggest them, we need more information about your system and what you are comparing the print speed to when you say it's slow.



MISCELLANEOUS SOFTWARE

Q: *I purchased some of the large capacity Verbatim QIC EXtra backup tapes you mentioned in Q&A in the February 1996 issue, and they came with Arcada's Windows 3.1 and Win95 backup software. But I like to run my backups from DOS, and my old DOS backup software doesn't recognize the full length of the newer tape. Is there any DOS software that'll work with these oversize tapes?*

A: The documentation with the tapes tells you how to get DOS software. Contact Customer Support, Verbatim Corp., 1200 W. T. Harris Blvd., Charlotte, NC 28262. Note that like most DOS software, you could use it to back up Windows 3.1 installations safely. However, if you back up a Win95 installation "from DOS" with such software, you'd lose your Win95 long file names, and because of that, may make the system fail if you restored from that made-in-DOS tape.

Q: *How can I create drop caps with my Ami Pro 3.0 word processor?*

A: Drop caps can be a neat way to catch attention and break up typographic monotony. The older Ami Pro had no actual command to create a drop cap, but you easily can make a small frame, type a large letter inside it, go to Frame, Modify Frame Layout, remove all borders and shadows, specify Flow Around, and locate Where Placed. That'll do it.

There's also a macro available on the CompuServe Lotuswp forum that'll do the trick more easily. It's called Drpcap.zip. In Lotus' newer upgrade of Ami Pro, manually making drop caps is a little smoother. *Word For Windows* also can do drop caps: Choose Format, then Drop Cap. Word offers two flavors. The letter can be dropped below or placed in the margin. Because Word frames the cap, you actually can drag it to whatever position you like or use Format/Drop Cap to define the position precisely.

Not many programs, not even the most expensive desktop publishing programs, do drop caps automatically. *Ventura Publisher* can do it just by highlighting and putting the Drop Cap attribute on—the way you'd bold or italicize. But *Quark Xpress* and *PageMaker* both require external add-on utilities to reformat the paragraph and pop the cap into a separate text block. ●

Get straight answers to your technical questions. Ask *PC Novice*! Send your questions, along with a phone and/or fax number so we can call you if necessary, to: PC Novice Q&A, P.O. Box 85380, Lincoln, NE 68501. Please include all version numbers for all software about which you're inquiring, operating system information, and any relevant information about your system. (Volume prohibits individual replies.)

ACTION

EDITOR

When Ralph Nader can't be reached, bring your computer service problems to our Action Editor column. This page will help you find products, resolve service problems, and keep manufacturers alert to the critical issue of customer relations.

Are you having trouble finding a product or getting adequate service from a manufacturer? If so, we want to help solve your problem. Send us a description of the product you're seeking or the problem you've had with customer service. In billing disputes, include relevant information (such as account numbers or screen name for online services) and photocopies of checks. Include your phone number in case we need to contact you. Letters may be edited for length and clarity; volume prohibits individual reply. Write to:

Action Editor
P.O. Box 85380
Lincoln, NE 68501-5380
or
Send E-mail to 74644.3017@compuserve.com
or
Fax us at (402) 479-2104

Dear Action Editor:

After noting that PC Novice recommended Quicken Deluxe 5 for Windows, I purchased the program. To my surprise, the program would not perform properly. After spending about 14 hours entering financial information, I printed an Itemized Categories Report and found the program printed totals in place of some numerical totals.

I called Intuit's technical support staff, and we spent about 40 minutes trying to get the asterisks changed to numbers. (The representative) was unable to do so and promised to call the next day with a resolution to my problem. Having received no call, I wrote the president of Intuit requesting help. I have received no response.

Your help in determining the cause of the program's failure would be greatly appreciated.

Ralph I. Freudenthal
West Palm Beach, FL

We contacted Intuit and explained Ralph's problem. About 12 days later, a representative called to say that an engineer had contacted Ralph and solved the problem.

When we called Ralph, he confirmed that an engineer had called and discovered that Quicken was not automatically enlarging columns when the dollar amounts were wider than the columns. The engineer explained how to widen the columns, and Ralph's totals appeared as they should.

* * *

Dear Action Editor:

I subscribed to America Online, but my subscription was abruptly canceled. I was told that I was canceled because of "solicitation of credit card information via IM" and that I must explain to "Terms of Service."

I sent them a fax telling them that I assumed I was being accused of a criminal act but that I did nothing knowingly and that I wanted an explanation. I received no answer after 15 working days (the time I was told it would take to be answered) and sent a second fax; still no answer. I am now on CompuServe, but I still would like an explanation since this appears to be a serious charge.

Robert A. Hersch, M.D.
Los Gatos, CA

An IM is an Instant Message, or private conversation between America Online users. It is against the service's terms of agreement to request information from other members regarding their credit card numbers.

An AOL representative looked into Robert's account at our request and found that he was actually still qualified to be an AOL member. When AOL contacted Robert and offered to let him sign up again, he declined. The representative could not give us the confidential details of why Robert's subscription was canceled.

* * *

Dear Action Editor:

I called to order the Windows 95 software upgrade for my Logitech mouse. I was told it would be sent in a few days, but I received nothing in over a month.

At that time, I also ordered a ScanMan Color scanner from Logitech and was told it needed a software upgrade to work with Win95. I was told the upgrade would follow the scanner by a few days. It also has failed to appear, and I can't use the scanner without the software.

The scanner is advertised as being sold on a 60-day trial basis, and Logitech offers a toll-free number to call with questions. The company tells me the software is delayed. When I call to say I want to return the scanner, I'm told to call a 500 number, where I'm put on hold for 20 minutes and get no help.

When will I get the mouse software upgrade, and when will they pay the cost of returning the scanner?

James Andrews
Conway, NH

After several phone calls, we sorted out James' problem. A Logitech public relations representative confirmed that the Win95 upgrade was free for any scanners purchased after Nov. 1. She found no record of James' order for the upgrade, but she said she would work on the problem and call us back.

Two weeks after our initial call to Logitech, James called to say that a Logitech representative called him to discuss the situation. He told her he'd like to get his software, but since that seemed impossible, he'd just like to return the scanner because a sheetfed scanner fit his needs better anyway. The Logitech rep said she'd have to call him back about getting Logitech to pay for the return shipment.

We left a message at Logitech that day reminding them of James' frustration. Later that day, a service rep called James and said she'd send the mouse software out right away at no charge. She also offered to exchange James' hand-held scanner for a PageScan scanner, which includes the Win95 software in the package, charging him the difference between the ScanMan and the more expensive PageScan. James told us he was pleased with the arrangement and would remain a Logitech customer. ●

GLOSSARY
Of Terms

Baud—The number of signal changes, or events, on a transmission line during one second. This differs from bits per second (bps) because more than one bit could be transferred during an event.

Bulletin Board Service (BBS)—An online area reserved for posting messages and information, usually on a very specific topic such as local information or technical support for one company's products.

Cache—Memory area where the CPU can quickly access frequently used data. Cache memory helps to speed up a computer.

CPU—Central Processing Unit. Sometimes called the brains of a computer, the CPU is the main microchip that finds, reads, and executes the millions of different instructions needed for a computer system to function.

COM Port—Communications Port. A plug-in socket located on the back of a computer's case that is used for hooking up devices such as mice and modems.

Flat Plasma Display—More commonly referred to as a gas plasma display, flat-panel, or simply as a plasma display, these are often used on portable computers. A neon inert gas material is contained between two layers of crisscrossing electrodes—one that has electrodes running horizontally and the other running vertically. The display charges the electrodes to create the dots that form on-screen images. A pixel is "lit" when two electrodes that cross are charged.

GPS—Global Positioning System. A network of satellites that lets users establish their location to within a few feet anywhere on or above the surface of the Earth, depending upon the satellites. The network uses continuously transmitting satellites, which send radio signals as they orbit the globe.

Handwriting Recognition Software—A program that allows the use of handwriting via a stylus pen as a way of inputting information into a computer.

HDTV—High Definition Television. HDTV generates images that are crisper and clearer than conventional television pictures because in the United States, they will use all digital broadcasting signals. (Current standards use analog signals.) HDTV, which isn't yet widespread, requires special transmission equipment and television sets to receive television images.

Input Device—Any device that brings information into the processor. Keyboards, mice, trackballs, and scanners are all examples of input devices.

I/O Port—Input/Output Port. A connector on the computer where you plug in an input or output device (such as a printer). The port is recognized by the computer by an address that it uses to send or receive information.

IRC—Internet Relay Chat. A type of interactive communication on the Internet in which computer users engage in real-time communication.

IRQ—Interrupt Request Lines. The wires that connect your microprocessor to hardware devices. IRQ lines let the devices request their share of attention from the microprocessor. Each line has its own address in the computer's memory.

Jumpers—A group of small, metal pins with plastic blocks covering some of the pins. By changing the position of the blocks (which contain tiny electrical connectors), you can change the settings of a hardware device.

OCD—Optical Character Recognition. A type of software that converts scanned or faxed images into text information that may then be edited like normal text.

PDA—Personal Digital Assistant. A handheld portable computer that can link with a PC in order to update information.

RAM—Random-Access Memory. Memory area in a computer where the CPU stores data that it is currently using. The more RAM a computer has, the faster it operates. RAM, however, is not permanent; data stored there must be placed on a hard drive or another permanent storage device before the computer is turned off, or the data is lost.

SIMM—Single In-line Memory Module. Circuit board that contains RAM chips. These boards are inserted into a motherboard and supply the RAM needed for computer operation. Most motherboards have four SIMM slots. SIMMs come in a variety of RAM configurations, so users can buy as much (or as little) RAM as they can afford.

Script—Also known as a call-in script. A record of keystrokes and commands that can be played back in order to automate routine tasks such as logging on to an online service.

SLIP/PPP—Serial Line Interface Protocol/Point-To-Point Protocol. Connections that let you connect your computer to the Internet itself, rather than logging on through an Internet access provider's host computer and issuing commands through a shell. SLIP/PPP connections let you communicate directly with other computers on the network using TCP/IP connections.

SVGA—Super Video Graphics Array. The Video Electronics Standards Association (VESA) video standard for a high-resolution, color computer display. While SVGA monitors can support a number of different configurations, the highest standard resolution is 1,280 x 1,024 and 16 million colors.

TSRs—Terminate-And-Stay-Resident Programs. These programs, usually used in DOS, are loaded into memory and pop up when hotkeys are pressed.

User Group—An organized band of individuals who share an interest in a particular computer, operating system, software application, peripheral, or any other computer component.

800 Reader Service

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Letters To The Editor

Dear *PC Novice:*

I am new to the world of computers since August of 1995. I am writing to tell you that your magazine is one of the finest I have seen on how to use computers. I look forward to every issue, and I convinced my library to subscribe to your magazine.

Your articles are concise, well-written, and easy to understand. Other magazines look like visual grafitti—too many ads, too much color all over the place making it hard to focus, etc. I hope you don't change the format. (The Q&A at the back is most informative also.)

Arthur Joseph Williams/via the Internet

Dear *PC Novice:*

I have read both the *PC Novice Guide to Windows* and the *PC Novice Guide to Windows 95* and find them both to be extremely well-written. You have chosen your writers very well because they write clearly, to the point, and with a touch of humor, but they do not talk down to the reader.

I teach a little eight-hour workshop in Windows 3.1 and have adopted the first Windows book as the course text. If I teach the workshop for Windows 95, I'll be sure to adopt the Windows 95 book for that course, too. Please keep up the good work!

Jon I. Gottlieb/Wrentham, MA

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Letters to the Editor should be sent to: *PC Novice* / P.O. Box 85380, Lincoln, NE 68501-5380. Letters may be edited for clarity or space.

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Editorial
COMMENT

The Good, uh, *New* Days

Who Needs Nostalgia? Today's Computing Is The Best Ever

It may frighten radio hosts, crotchety guys in rocking chairs, and others who fill their days bemoaning the sorry state of society, but things have never been better.

Clearly we're not talking about political integrity or major league pitching here. Rather, we're swimming in optimism over the state of computing. It's rare that we can bask in the warm knowledge that we're living in the best era that's ever been—for anything. But it's clear that any smart PC user with the option of traveling back in time would politely decline and hang out in 1996 (unless, of course, they headed back to pick up some cheap Microsoft stock).

Market trends favor consumers because manufacturers know the toughest ground remains to be captured in the battle to get computers on everyone's desk. They must reach the customers who have historically resisted computers because of cost, difficulty of use, and the fact that computers just don't seem to do anything they really need. The companies are on the right track with several factors that have made the Silicon Age seem like the Golden Age for anyone that spends time with a mouse in hand.

Software, for starters, is as easy to use as it's ever been. Sure, plenty of programs are still temperamental, but remember that we're talking about the best situation that's ever *been*, not that *could be*. With a little practice, you can jump among several open applications, searching for data in one and shooting down mutants in another. Most people with rudimentary PC experience can navigate new programs in minutes without reading the manual. Even if you loathe Microsoft, its years of market influence have given us software developers whose products follow a Windows-inspired organization (with a nod to the Macintosh) that offers users familiar territory in new products.

Going online gets simpler constantly. Where once accessing the Internet required relatively rare access rights and knowledge of obscure text commands (and the patience to "surf" the 'Net by reading them), today it means quickly installing software, typing in the subject you seek, and clicking pages until boredom takes over.

Online ideas such as the Java programming language promise to simplify software even more. Yesterday's PC users struggled to find programs that simply worked with their brand of computer, much less a particular operating system. Today, there really are only two flavors of the same operating system to worry about on the IBM-compatible scene, and Java could ensure that downloadable applets work on any computer regardless of creed or platform.

Hardware is also becoming more manageable in this maturing industry. In writing a series that starts in this issue, we found that building a PC is surprisingly feasible for users with limited hardware experience. Industry standards that took years to hammer out (MPC, Plug and Play, the EISA bus) mean manufacturers are finally on the same page, making parts that work with each other.

Computer users have never been able to pine for anything like the $2,000 cars and one-cent candy of yesterday. While most prices have risen over the years, computer components continue to get cheaper. The price of RAM, the vital breathing room of computing, has fallen from about $40 per megabyte last summer to under $20 per megabyte this spring. A one gigabyte (GB) hard drive that cost about $800 in the spring of 1995 is available now for about $200. Intel has announced upcoming price cuts on all its Pentium microprocessors. By the end of the year, 120MHz chips probably will be considered entry-level (75MHz is today's beginning standard). Several portable PC models that actually do what's needed are now available for $2,000 or less.

All of this usability and affordability creates synergy that offers impressive possibilities. Consider this scenario: Average users can get on the World Wide Web (through their $20-per-month accounts that offer unlimited access), download photos with a 28.8 kilobytes per second (Kbps) modem (soon to be an ISDN line offering 126Kbps access), view them on a 17-inch monitor, and, if the 1GB hard drive is nearly full, save them on an external Zip drive (available for less than $200) that supports cartridges holding 100 megabytes of storage. If users would rather put their own photos on the PC, they can enter them with an affordable, easy-to-use scanner. Any one of these items would have raised eyebrows a few years ago; now each is part of many mainstream setups.

Clearly, it's hard to talk about the good old days at times like this. Sure, we still face problems such as balky Internet delivery and maddening software lockups. But if we fixed everything, what would guys in rocking chairs talk about? ●

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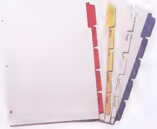

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